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16. ABSTRACT

The precision and accuracy of the Modified Method Five (MM5) sampling and analysis scheme for polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/PCDF) in municipal waste combustor (MWC) stack gas have been determined. This was accomplished using a dynamic spiking system designed to continuously deliver stable isotopic PCDD/PCDF congeners into the MM5 sampling train upstream of the particulate filter during sampling of incinerator stack gas. Field validation tests to measure the recovery of statically and dynamically spiked PCDD/PCDF during stack gas sampling indicated that the resin effectively retained the static spike during operating conditions. Dynamic spike recoveries were inadequate, partially due to the use of dichloromethane as the extraction solvent. Toluene was subsequently shown to be more appropriate than dichloromethane for obtaining enhanced recoveries of PCDD/PCDF.

The overall sampling and analysis scheme as recommended in this report was estimated as at better than 80% for the accuracy and as at ± 35% for the precision.

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FOREWORD

Measurement and monitoring research efforts are designed to anticipate environmental problems, to support regulatory actions by developing an in-depth understanding of the nature and processes that impact health and the ecology, to provide innovative means of monitoring compliance with regulations, and to evaluate the effectiveness of health and environmental protection efforts through the monitoring of long-term trends. The Atmospheric Research and Exposure Assessment Laboratory, Research Triangle Park, North Carolina, has responsibility for assessment of environmental monitoring technology and systems for air, implementation of Agency-wide quality assurance programs for air pollution measurement systems, and supplying technical support to other groups in the Agency including Office of Air and Radiation, the Office of Toxic Substances, and the Office of Solid Waste.

PCDDs and PCDFs are being evaluated for future emissions regulations because of their high toxicities. Acceptable measurement methodology is critical for proper assessment of the impact on the environment of these emissions from stationary sources. Development and validation of measurement methods are key components for producing an acceptable method. This study was undertaken to perform development and validation work on a method for the quantification of PCDD and PCDF emissions from stationary sources.

Gary J. Foley
Director
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DISCLAIMER NOTICE

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PREFACE

This report was prepared for the Environmental Monitoring Systems Laboratory under EPA Contract No. 68-02-4395, Work Assignment 23. The previous phases of the research were conducted under EPA Contract No. 68-02-3999, Work Assignment Nos. 7, 9, 14, and 15. Subsequent phases have been conducted under EPA Contract No. 68-02-4395, Work Assignment 9. The objectives of the research are to evaluate and validate a modified EPA Method 5 sampling system for determining polychlorinated dibenzo-*p*-dioxins and dibenzofurans in municipal waste combustor emissions. The MRI work assignment leader is Dr. John T. Coates. Dr. George Scheil is the field crew chief.

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SECTION 1.0

ABSTRACT

The overall objective of the investigation was to characterize the precision and accuracy of the Modified Method Five (MM5) sampling and analysis scheme for the analysis of polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDDs/PCDFs) in municipal waste combustor (MWC) stack gas.

A dynamic spiking system was developed to facilitate validation of the MM5 method for PCDD/PCDF collection and recovery from MWC flue gases. The system was designed to continuously deliver stable isotopic PCDD/PCDF congeners into the MM5 sampling train upstream of the particulate filter during sampling of simulated or actual incinerator stack gas. The dynamic spiking system was initially tested in the laboratory to determine a suitable injector solvent and to demonstrate recovery of spiked PCDDs/PCDFs at two spiking levels. Toluene was selected as an injector solvent based on the first laboratory test. The high spike (500 ng) exhibited quantitative recovery (99% to 121%) for each PCDD/ PCDF spiked, but a large proportion of the material was recovered from the back half glassware of the train. The low spike (5 ng) also had high recoveries (64% to 92%) of each PCDD/PCDF spiked, but somewhat less material was collected in the back half components, and the recovery at the filter and XAD increased. Laboratory tests of the dynamic spiking system were successful and indicated that it would serve as an appropriate field spiking technique.

Upon completion of the initial applicability study, a laboratory verification investigation was conducted to determine the suitability of the dynamic spiking system for field use. To this end, replicate MM5 sampling trains equipped with the dynamic system were set up to determine the accuracy and

precision of stack sampling and analysis methods. The recoveries of the dynamically spiked compounds ranged from 50% to 99% for the low spike (5 ng) and from 60% to 97% for the high spike (500 ng). These results indicated that, in the absence of particulate matter, gas phase dioxins and furans are impinged in the back half glassware of the MM5 sampling train.

Following the verification study, a field validation test was conducted to measure the recoveries of statically (a direct spike onto XAD-2 resin) and dynamically spiked PCDDs/PCDFs during incinerator stack gas sampling. This approach was used to establish the usefulness of the dynamic spiking system in a realistic sampling matrix. Recovery of the static spike ranged from 95% to 106% (with one outlier at 223%) indicating that the resin effectively retained the spike during operating conditions. Recovery of the dynamic spikes had an overall average of 21% and were moderately variable. The largest fraction of the dynamic spike compounds were found on the filter. Analytical checks for accuracy indicated adequate sample preparation and analysis. Reextraction of the filters using benzene increased overall recovery to 26%, suggesting that a π-bonded solvent (e.g., benzene and toluene) may be more appropriate than dichloromethane (DCM) for extracting PCDDs/PCDFs from particulate matter. Subsequent tests confirmed this as described below.

Since the initial field test and subsequent analysis in the laboratory failed to establish acceptable precision and accuracy data for spiked PCDDs/PCDFs and indicated that DCM may not be a suitable extraction solvent, a second laboratory study was proposed and conducted to study the effect of solvents, unburned carbon and ash type on the recovery of labeled PCDDs/PCDFs from MWC fly ash. This study in part was proposed to investigate the effect of unburned carbon on recovery, since similar studies elsewhere had indicated a lack of knowledge in this area.

Two MWC fly ash composites were augmented with carbon black at several levels and extracted using DCM, benzene and toluene. Addition of unburned carbon to both ashes increased the extractability of spiked PCDDs/PCDFs from the matrix when DCM was used as the extraction solvent. However, a parallel effect was not noted for either benzene or toluene. In general terms, toluene was the most effective solvent for both ashes at all levels of carbon amendment.

During the initial laboratory phases of this study, it was observed that gas phase dioxins and furans were impinged in the back-half components of the MM5 train. This observation was not realized during the field tests, in which the bulk of the target analytes were recovered from the filter. In addition, it was found that toluene was a more effective extraction solvent than DCM. With this information in hand, a novel technique to enhance sample recovery from back half glassware was developed and investigated.

A laboratory test was conducted whereby the back half glassware of the MM5 sampling train was coated with a thin layer of Apiezon-L grease. Labeled PCDD/PCDF congeners were dynamically spiked into the sampling trains at two levels (25 and 500 ng). The back half glassware was recovered by rinsing with acetone and then toluene after sampling. A second test was also conducted sampling the flue gas from a fuel rich kerosene combustor. The laboratory test demonstrated that rinsing the Apiezon-L coated back-half glassware with toluene resulted in recoveries ranging from 67% to 133%, whereas the uncoated sampling trains had recoveries of 8% to 35%. Similarly, increased recoveries were observed when sampling the flue gas from the kerosene combustor.

A set of field experiments were carried out to characterize the precision and accuracy of the MM5 sampling train using the modified sample recovery procedures. A secondary set of tests was conducted to determine if the operating temperature of the filter box assembly affected the distribution and impingement of PCDDs/PCDFs within the sampling train. This study was run while sampling incinerator flue gas laden with particulates. The experimental approach was as in previous field tests whereby the recovery of labeled PCDD/PCDF congeners were statically and dynamically spiked onto MM5 trains. Samples were collected at the inlet and outlet of the unit's electrostatic precipitator. The MM5 filter box was run at 250°F and at 420°F.

Recoveries of the static spike were lower at the higher filter box temperatures, but only at the inlet sampling location. The reasons for this are not fully understood. Recovery of the dynamic spike at the inlet sampling locations ranged from 49.5% to 70.6%, but most of the values were higher than 65%. Thirty-nine of 60 sets of duplicates had a relative percent difference (RPD) of less than 35%. For the dynamic spike at the outlet sampling locations, recovery ranged from 62.9% to 107%. However, 58 of the 80 sets of duplicates had RPDs in excess of 35%. A significant portion of this variability may be attributed to intertrain differences in the evenness of the Apiezon-L coating. These recoveries were higher than those obtained during the first set of field tests, indicating that the modifications were successful.

Increasing the temperature of the filter box resulted in a redistribution of the dynamically spiked PCDDs/PCDFs towards the back components (back-half and XAD) of the sampling trains at both the inlet and outlet sampling locations. However, the native dioxins and furans did not undergo an analogous redistribution when high filter box temperatures were applied. This may be a reflection of a difference in the nature of the association between the native and the dynamically spiked dioxins and furans with the particles. Comparison of the total recovered native (unlabeled) dioxins and furans at the inlet and outlet sampling locations suggest, especially for the dioxins, that a notable proportion of these compounds were transported in the flue gas in association with the particulate matter.

SECTION 2.0

INTRODUCTION

Municipal incineration of waste, coupled with energy recovery, is a practice that is gaining favor in current efforts directed at finding economic, effective, and efficient alternatives to land burial.[1] The U.S. Environmental Protection Agency (EPA) has undertaken to regulate municipal waste incinerators and to characterize their emissions in order to allay public concerns about their emissions.[2] Among pollutants of such concern are the polychlorinated dibenzo-*p*-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs).[3]

A Modified EPA Method 5 (MM5) sampling train, incorporating an ice water-chilled condenser and XAD-2 resin cartridge, has been used to collect medium volatility organic compounds from stack gases for a wide range of combustion sources. The configuration and operating procedures for this system in determining polychlorinated dibenzo-*p*-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) in municipal waste combustor (MWC) emissions were standardized by a workshop sponsored by the American Society of Mechanical Engineers (ASME), U.S. Environmental Protection Agency, and U.S. Department of Energy held in September 1984. The product of the workshop was a draft sampling and analysis procedures document known as the ASME protocol.[4]

A number of comparison studies have been made of stack sampling methods for PCDDs and PCDFs. Recently, this work has been reviewed.[5]

The ASME method has become the industry standard for sampling stack gases for PCDDs, PCDFs, PCBs, and many other semivolatile organics. However, low recoveries for specific PCDD isomers spiked into MM5 sampling trains were observed during pilot and field evaluation studies conducted under contract to

EPA's Environmental Monitoring Support Laboratory (EMSL). Since these observations were based on limited experiments, additional data were needed to determine the precision and accuracy of the MM5 system for collecting and recovering PCDD and PCDF emissions.

The overall objective of the current study is to characterize the precision and accuracy of the MM5 sampling system using stable isotopically labeled PCDD and PCDF compounds spiked during MWC flue gas sampling. Causes of unsatisfactory method precision or accuracy were investigated to facilitate improved method performance. The study was conducted in several iterative phases as listed below.

Phase 1--Design and development of a dynamic spiking system for continuously introducing labeled compounds into the train during sampling.

Phase 2--Determination of method reproducibility and accuracy using MWC flue gas background.

Phase 3--Investigation of the influence of carbon content and extracting solvent on PCDD and PCDF extraction from MWC ash.

Phase 4--Investigation of sample recovery enhancement procedures.

Phase 5--Determination of precision and accuracy using modified recovery procedures with MWC flue gas background.

Additional laboratory and field tests are also in process. The results of the current work will be presented in a subsequent report.

Several test runs were conducted for each of the above phases of the investigation. A numerical system was established to label each test run within the five chronological phases. Table 2-1 lists each test run included in this report.

The Executive Summary of this report is presented in Section 2, and recommendations based on the current status of the research are discussed in Section 3. The succeeding five sections describe the experimental design, procedures, and results for each phase.

Appended to this Draft Final Report are Appendix A, Native PCDDs and PCDFs in MM5 Extracts From the Phase 5 Study; Appendix B, Analytical Protocol for PCDDs and PCDFs in Stack Emissions; and Appendix C, Lotus Spread Sheets for Samples Analyzed in the Validation of Emission Test Methods for PCDDs and PCDFs.

TABLE 2-1. NUMBERING SYSTEM FOR TESTS CONDUCTED IN EACH PHASE OF THE INVESTIGATION

Phase 1	Run 1 2 3	Laboratory tests of the dynamic spiking system
Phase 2	Run 4 5	Laboratory tests to demonstrate recovery of PCDD/PCDF at two spiking levels using MM5 sampling train
	6 7 8 9 10 11	Field tests to determine MM5 sampling and analysis method reproducibility and accuracy using MWC flue gas
Phase 3		Laboratory tests to investigate the influence of unburned carbon on extractability of PCDD/PCDF from ash
Phase 4	Run 12 13 14 15 16 17	Laboratory tests to investigate sample recovery enhancement procedures for the MM5 sampling train
Phase 5	Run 18 19 20 21	Field tests to determine the distribution of PCDD/PCDF within the MM5 sampling train for high filter box temperature and to determine the precision and accuracy of the MM5 protocol using sample recovery enhancement procedures studied in Phase 4

SECTION 3.0

RECOMMENDATIONS

Results from this investigation have demonstrated that the dynamic spiking system developed under this contract is appropriate for field use. Given the proven suitability of the technique for PCDDs/PCDFs, consideration should be given to expanding its application to other semivolatile organic compounds of interest.

Toluene appears to be the most effective solvent in recovering PCDDs/PCDFs collected in the MM5 sampling train sampling MWC emissions; therefore, its use is recommended in all phases of MM5 procedures.

Data presented in Section 7 of this report suggest that recovery of back-half glassware may be significantly enhanced by coating the glassware with a material that can be effectively solubilized by the recovery solvent. Therefore, the use of alternative coating materials should be investigated.

Although the ash extraction study provided useful information on the extractability of surrogate spike compounds (labeled PCDDs and PCDFs dynamically spiked into the train during the test run), the native PCDD and PCDF results produced in the study should be examined to fully investigate the effect of unburned carbon on PCDD and PCDF extraction from ash.

A sampling system should be developed to allow reliable characterization of the distribution of PCDDs and PCDFs between vapor and particulate-associated phases. This would facilitate characterization of the thermodynamic potentials and kinetic rates of gas phase sorption for PCDDs and PCDFs, in turn, facilitating development of control strategies for PCDDs and PCDFs in incineration emissions.

SECTION 4.0

PHASE 1--DEVELOPMENT OF A DYNAMIC SPIKING SYSTEM

A dynamic spiking system was developed to facilitate characterization of the precision and accuracy of the modified Method 5 train (MM5) for PCDD and PCDF collection and recovery from MWC flue gases. The objective of the system was to continuously deliver PCDD and PCDF surrogate compounds, i.e., stable isotopically labeled congeners, into the influent of the train during sampling of simulated or actual flue gas. The design and laboratory testing of the system are described below.

4.1 SYSTEM DESIGN AND FABRICATION

The primary requirements of the spiking system were to deliver the spike compounds at a consistent (and known) rate in the vapor phase during the 3- to 4-h duration of a typical sampling period. Because of low volatility of the target compounds, the spiking system was operated at a temperature higher than the MM5 train filter box. This temperature was selected on the basis of estimates of saturated vapor volumes for 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) and octachlorodibenzo-p-dioxin (OCDD) calculated from published values of the thermal properties of dioxins.[7,8] Table 4-1 contains estimates of the vapor pressures and saturated vapor volumes of the compounds under consideration.

These calculations are approximations only (within a factor of two), since the melting and boiling points do not exactly match those of cadmium and deviations from the normal vapor pressure laws do occur. The normal MM5 temperature is clearly inadequate to vaporize the OCDD isomers. In practice, the injector system would not approach equilibrium conditions due to short contact time and incomplete mixing.

TABLE 4-1. ESTIMATED SATURATED VAPOR VOLUMES OF TCDD AND OCDD AT 120° AND 200°C

Temperature (°C)	Mass (ng)	Saturated vapor volumes (L)*	
		TCDD	OCDD
120	5	0.0014	1.8
	50	0.014	18
	500	0.14	180
200	5	3×10^{-6}	8×10^{-5}
	50	3×10^{-5}	8×10^{-4}
	500	3×10^{-4}	8×10^{-3}

* The estimated vapor pressures for TCDD at 120° and 200°C are 0.0353 and 21.4 Pa, respectively; the estimated vapor pressures for OCDD at 120° and 200°C are 0.000115 and 0.508 Pa, respectively.

Maintaining a relatively constant rate of addition places further constraints on the injector design. Due to the toxicity and cost of the spike compounds, use of controlled temperature saturators or permeation systems are not practical because they require a large excess of material. Controlled heating of a coated wire was also considered, but would require a separate wire for each compound due to the large differences in vapor pressures. Gas flow rates and mixing turbulence would also have to be closely controlled to ensure a stable release rate.

The design approach was to install a syringe injection unit just influent to the MM5 filter box. The system is shown in Figures 4-1 and system details are shown in Figures 4-2 through 4-4. The heated injection port was located at an angle in an elbow section (Figure 4-3) to facilitate rapid vaporization and mixing with influent sample gases. Syringe pumps were used to inject relatively small volumes of concentrated spiking solution to avoid introducing excessive volumes of solvent.

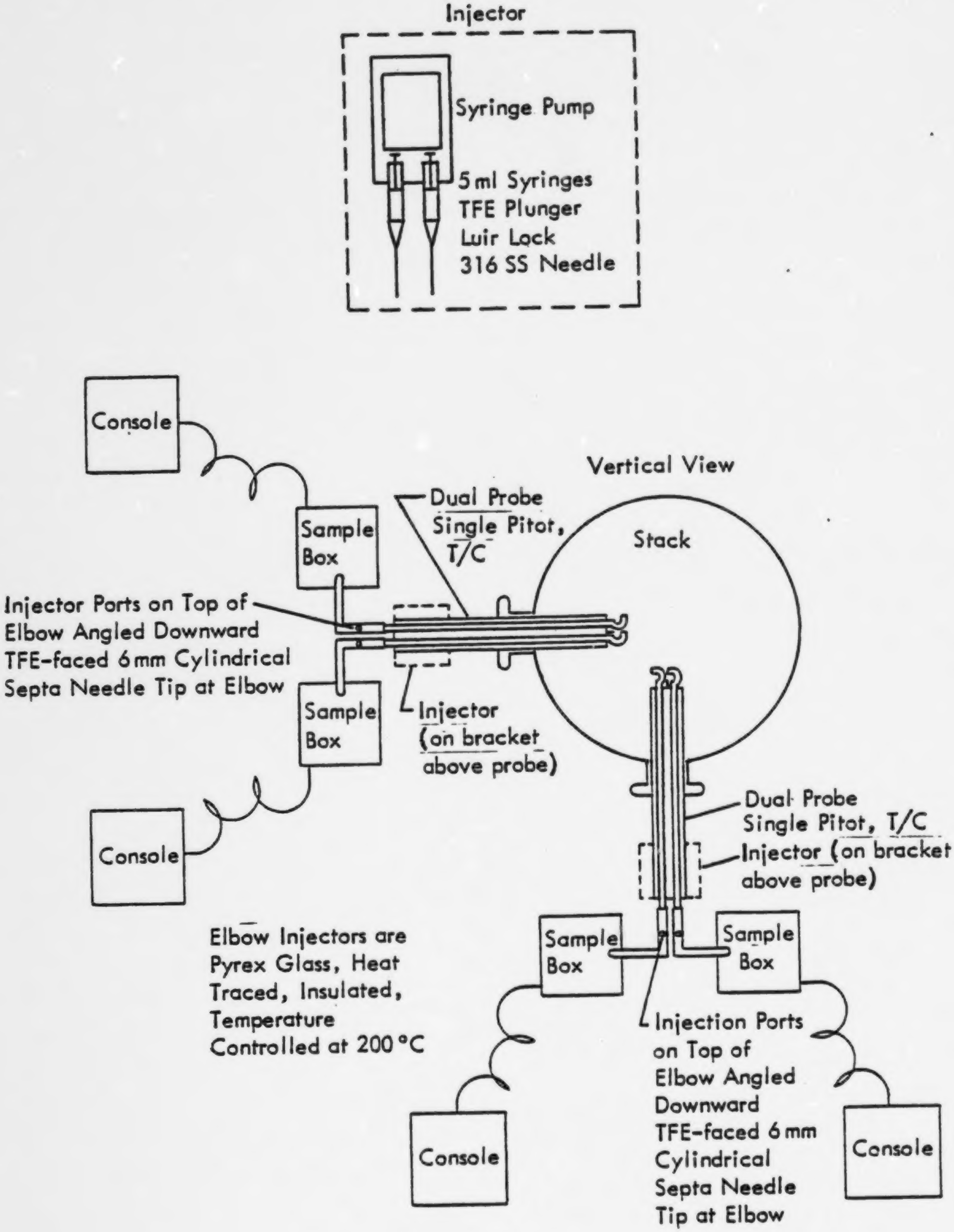


Figure 4-1. Dynamic spiking system.

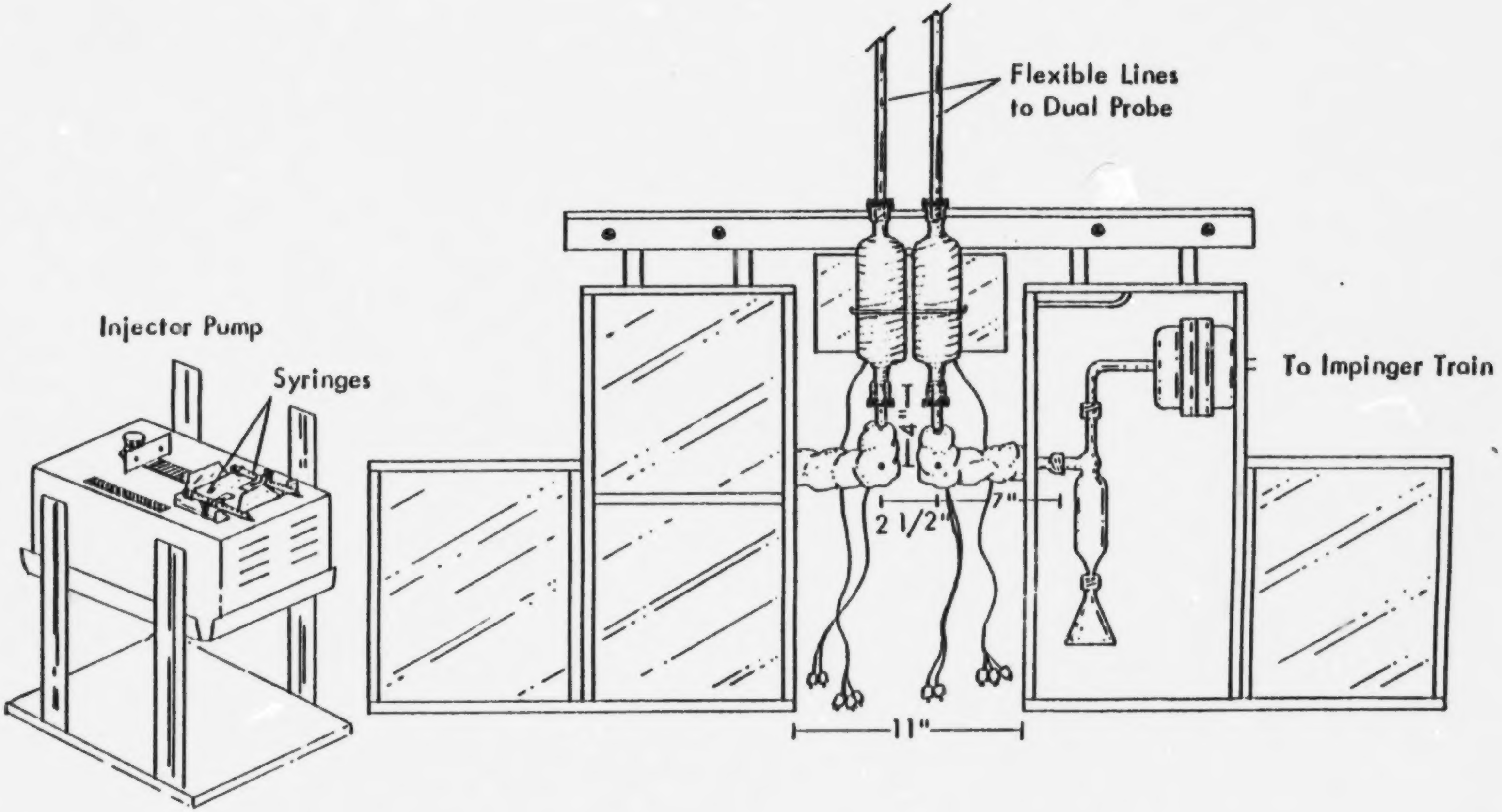


Figure 4-2. Injector system schematic.

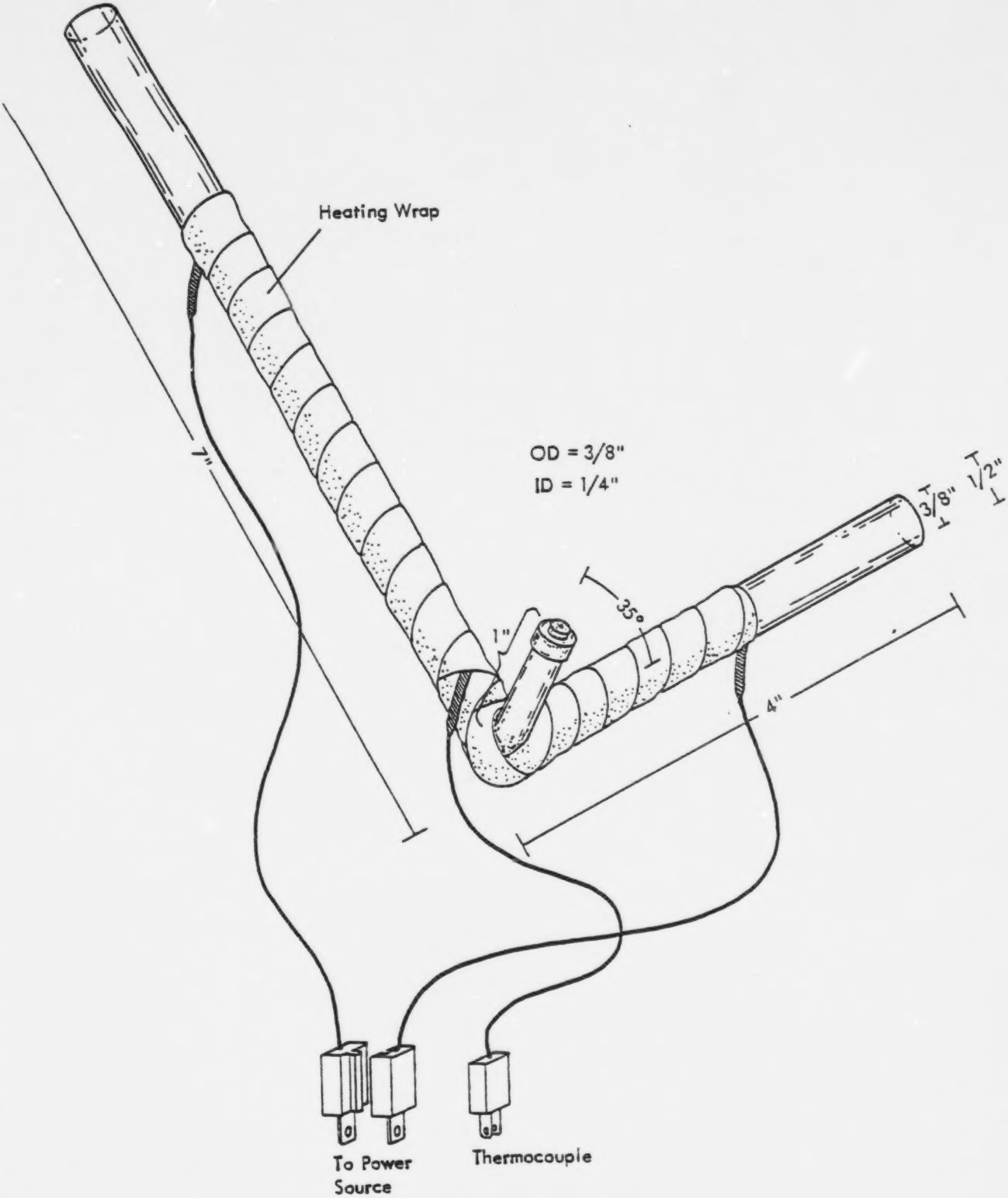


Figure 4-3. Injector elbow.

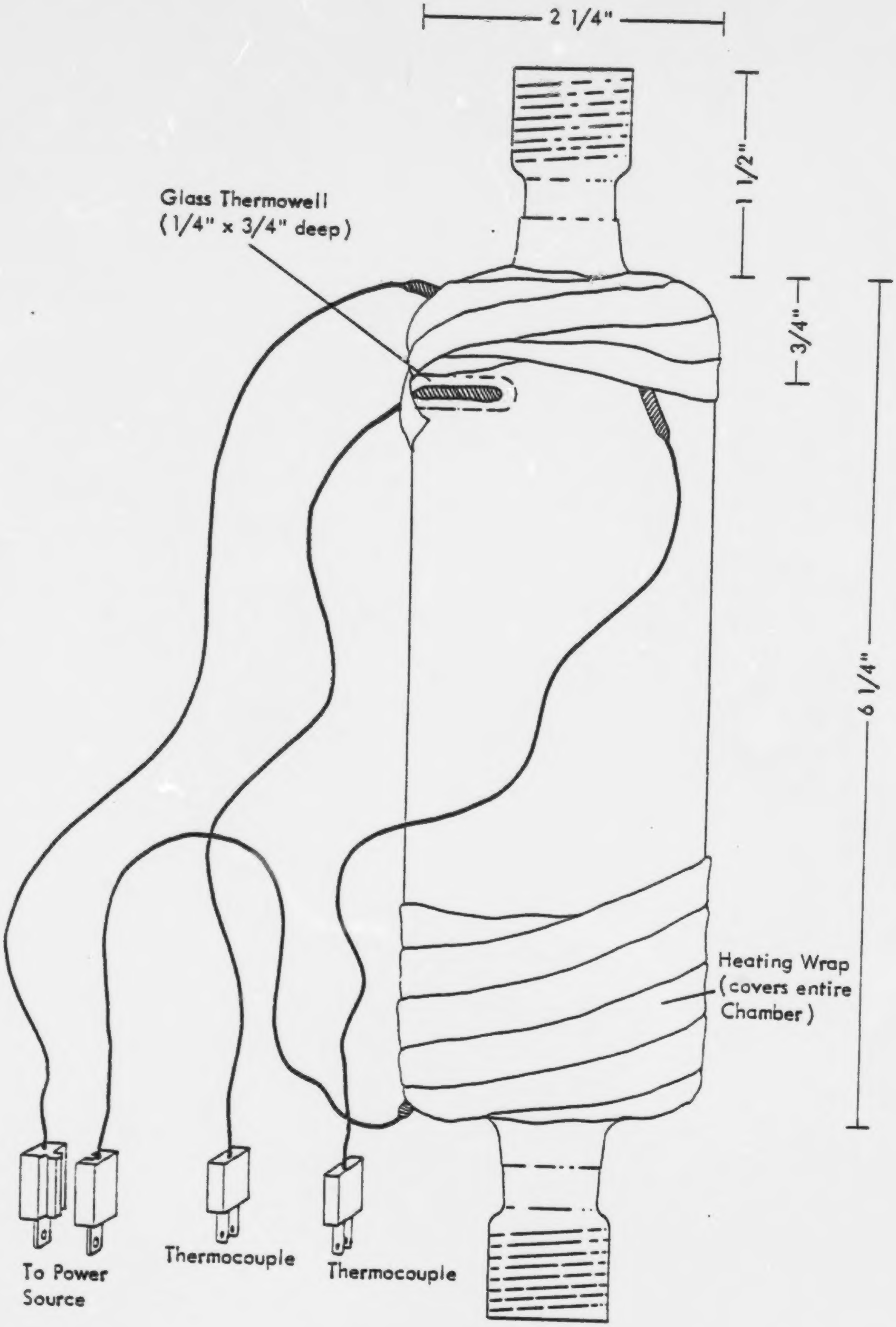


Figure 4-4. Preheat chamber.

All system parts in contact with dioxins or sample gas were entirely glass and Teflon except for the stainless steel syringe needle which is replaced for each run. The glass elbow is simple and easy to fabricate. The elbows were not to be reused but were archived for possible extraction for diagnostic purposes.

The elbow design shown on Figures 4-2 and 4-3 was used both to allow clearance between the sample boxes and to permit the injector needle to be placed at the bend for maximum turbulent mixing. The needle was oriented in the direction of the gas flow and downward to ensure complete ejection from the tip.

Toluene was the preferred solvent because its boiling point minimizes premature vaporization and permits much smaller liquid volumes in the syringe. Even with only 5 mL injected into 3 m^3, the exit gas from the consoles is near 500 ppm, still a possible personnel hazard. Larger volumes, e.g., 50 mL, would approach the explosion limits. The adsorption affinity of XAD-2 for the dioxins should be much greater than that of toluene.

The use of this design also permits the syringes for two sampling trains to be loaded into a single syringe pump. Inexpensive heat tapes with efficient insulation and an active controller set to 200°C facilitate vaporization.

4.2 SYSTEM TESTING

The proposed dynamic spiking system was tested under laboratory conditions to address (a) proper vaporization of the spiking compounds within the injector and (b) the use of toluene as a spiking solution solvent.

The vaporization tests began with a determination of the conditions necessary to maintain the desired 200°C injector temperature at typical sampling rates. A 12-mm Teflon flexible probe maintained at 120°C and an elbow wrapped with heat tape were initially tested but were unable to achieve a stable 200°C at the elbow. The test failed. An 18-mm diameter by 20-cm glass preheat section was added, but again, the target temperature could not be maintained at the 15-L/min sampling rate. A larger glass preheater was fabricated, measuring 5 cm in diameter and 15 cm long. This preheater was able to maintain a stable preheat temperature of 200°C at all normal operating conditions using two temperature controllers set at 200°C. Injector temperatures were verified by inserting a thermocouple down the injector bore. Temperatures were constant throughout the elbow section. This preheater design was used for all subsequent tests.

A partial sampling train was then assembled with modified U-tubes before and after the XAD cartridge so that slip streams could be withdrawn into the THC analyzer. Injecting toluene at a rate of about 1.6 cm^3/h with an airflow rate of 15 L/min, the THC analyzer showed constant toluene response at the XAD inlet after the first few minutes. The XAD outlet response remained near baseline for the first 1.5 h, rising to near the inlet response by the end of the 3-h injection period. A second test was then performed using methanol at the same test conditions. The XAD outlet response rose from baseline at about 5 min and remained near the inlet response until the test was halted after 2 h.

It was decided to proceed with toluene rather than methanol. Toluene is a much better solvent for PCDD/PCDF, and its retention characteristics in the XAD cartridge were acceptable.

The sampling train glassware was then cleaned five times in tap water, three times with deionized water, once with bulk acetone, and final rinses of twice each high-quality acetone followed by methylene chloride. The first full train run was made with an additional guard impinger of isooctane to collect any PCDD/PCDF carried through the XAD. For run 1 the train assembly consisted of (1) a condenser, (2) an XAD cartridge, (3) a Greenburg-Smith impinger with 100 mL of MilliQ water, (4) a modified impinger with 100 mL of MilliQ water, (5) a dry modified impinger, (6) a modified impinger with 100 mL of isooctane, and (7) a silica gel impinger. The train was leak-checked and started after a 30-min preheat period. After 30 min of stable operation, the 5-cm^3 syringe with spiking solution was loaded into the syringe pump, and injection started at 1.7 mL/h. After 1.75 h, bubbling in the isooctane impinger had ceased. After a successful leak check, the train was inspected and found to have a dry isooctane impinger. An additional 200 mL of isooctane was added, the train leak-checked, and operation resumed until a total sampling time of 4 h was attained. Temperatures remained stable during the run, but only about 20 mL of isooctane was left at the end of the run. The syringe was also left in place during the shutdown, and about 0.5 mL of spiking solution was pulled into the elbow during the intermediate leak checks. Because the isooctane was evaporating too rapidly to act as a keeper and because of the possible loss of part of the spike, this sample was voided. The glassware was recleaned in preparation for the next test.

A second test run was initiated with 50 mL of tridecane in place of the isooctane at a spike level of 500 ng. Starting with this run the flexible probe extended outside the lab window. The run was completed successfully. The second test run using the completely assembled MM5 sampling train was conducted for a 5-ng spike level. Prior to conducting the test run, the glassware was thoroughly cleaned using a chromic acid and alcoholic KOH bath to remove any potential carryover from the high spike test. All glassware was also etched with identifying numbers, and each use was recorded to prevent accidental transfer from a high to a low level spike. Run 3 was operated successfully at the same conditions as run 2 except for the spike level change.

4.3 RESULTS OF PRELIMINARY SYSTEM TESTS

Each of the ^{13}C-PCDD/PCDFs dynamically spiked into the sampling trains was extracted and analyzed by GC/ECD. Results of these test runs are shown in Table 4-2. Results of the high spike test indicate that recovery was quantitative for each PCDD/PCDF spiked. It was observed that 98% of the spike was impinged on the back-half glassware in lieu of the XAD-2 resin. Similar results were obtained for the low spike test. Overall recovery was somewhat less than observed from the high spike test, but the distribution of ^{13}-PCDD/PCDFs spiked into the train was similar. Most of the congeners were found (50%-75%) in back half but modest amounts (3%-30%) were also found in the filter extract and the XAD-2 resin extract. The data suggest that the development of the dynamic spiking system was successful and that it would likely serve as an appropriate field spiking technique.

TABLE 4-2. RECOVERY OF ^{13}C-PCDD/PCDFs FROM INITIAL LABORATORY SPIKING STUDY

Run	Spike level	Spike compound	Percent recovery				
			FH rinse	Filter	BH rinse	XAD	Sum
2	500 ng	^{13}C-TCDD	ND	8	87	4	99
		^{13}C-HxCDD	ND	1	108	4	113
		^{13}C-HxCDF	< 1	< 1	113	4	117
		^{13}C-OCDF	< 1	5	113	4	121
3	5 ng	^{13}C-TCDD	*	*	*	*	*
		^{13}C-HxCDD	ND	*	56	8	64
		^{13}C-HxCDF	ND	31	51	*	82
		^{13}C-OCDF	ND	13	76	3	92

* Chromatographic interference.

SECTION 5.0

PHASE 2--DETERMINATION OF METHOD REPRODUCIBILITY AND ACCURACY

5.1 LABORATORY TESTING

A laboratory verification study was conducted to determine the recovery (accuracy) and precision of duplicate 5- and 500-ng surrogate spikes using the dynamic spiking system. The sample preparation procedures used in this phase of the study are discussed in Section 5.2. Extracts were analyzed by GC/ECD, and in some cases, GC/MS.

5.1.1 Approach

Preliminary laboratory studies discussed in Section 4 were designed to address (a) proper vaporization within the injector and (b) acceptable recovery of labeled surrogate compounds spiked onto an MM5 train. Upon completion of the initial demonstration tests, a final verification test was conducted to demonstrate the suitability of the dynamic spiking system for field use.

Replicate MM5 sampling trains equipped with the dynamic spiking system were set up to determine the recovery and precision of the stack sampling and analysis methods. Trains were operated sampling ambient air for test runs 4 and 5. Labeled dioxin and furan congeners were spiked at 5-ng and 500-ng levels.

The specific isotopically labeled PCDD and PCDF congeners spiked onto the train are shown in Table 5-1. Table 5-1 also shows the congeners used as method and, for GC/MS analysis, recovery internal standards, i.e., those spiked into the sample prior to extraction and immediately before analysis.

TABLE 5-1. ISOTOPICALLY LABELED PCDD AND PCDF CONGENERS USED IN THE MM5 EVALUATION STUDY

Field spiked analytes	Method internal[a] standards	Recovery internal[b] standards
^{13}C-1,2,3,4-TCDD	^{13}C-2,3,7,8-TCDD	
	^{13}C-2,3,7,8-TCDF	
^{13}C-1,2,3,7,8,9-HxCDD		^{13}C-1,2,3,6,7,8-HxCDD
^{13}C-1,2,3,4,7,8-HxCDF	^{13}C-1,2,3,4,6,7,8-HpCDD	
^{13}C-OCDD		
^{13}C-OCDF		

[a] Internal standards added before extraction.

[b] Internal standards added just prior to analysis.

5.1.2 Results and Discussion

Results of the GC/ECD analysis indicated that most of the recoveries were in the back-half rinse with a smaller amount on the filter. However, several of the analyses results were confounded with coeluting and interfering peaks, likely due to the fact that the electron capture detector responds to several types of organic functional groups in addition to halogens. These extracts were analyzed by HRGC/MS to provide more reliable quantitation. The GC/MS results are in Tables 5-2 through 5-5. The mean percents recovered were 58%, 99%, 65%, and 78% for TCDD, HxCDF, HxCDD, and OCDF, respectively, for the 5-ng spike level and 60%, 97%, 76%, and 92% for the above dynamic spiked analytes for the 500-ng spike level.

These results indicate that, in the absence of particulate matter, gas phase dioxins and furans are impinged on the back-half glassware of the MM5 sampling train, specifically in the condenser. This is to be expected since the spiked analytes condense at ice bath temperatures. These data also suggest that quantitative recovery of spiked analytes from the sampling train depend on how efficient the glassware rinse recovery procedure removes analytes from the glassware surface.

TABLE 5-2. RECOVERY OF ^{13}C-LABELED POLYCHLORINATED DIBENZO-*p*-DIOXINS AND DIBENZOFURANS DYNAMICALLY SPIKED INTO THE MM5 TRAIN FOR RUN 4 (5 ng)

		Percent of dynamic spike recovered	
		Filter 4006	Back half 4008
Analyte			
^{13}C-1,2,3,4-TCDD	GC/MS	NF[a]	49
^{13}C-1,2,3,4,7,8-HxCDF	GC/MS	NF	108
^{13}C-1,2,3,7,8,9-HxCDD	GC/MS	1.2	68
^{13}C-OCDF	GC/MS	NF	79
Method Internal Standards Recovery %			
^{13}C-2,3,7,8-TCDF		51	49
^{13}C-2,3,7,8-TCDD		116	109
^{13}C-1,2,3,7,8-PeCDD		65	67
^{13}C-1,2,3,4,6,7,8-HpCDD		64	68

[a] NF = not found.

TABLE 5-3. RECOVERY OF ^{13}C-LABELED POLYCHLORINATED DIBENZO-p-DIOXINS AND DIBENZOFURANS DYNAMICALLY SPIKED INTO THE MM5 TRAIN FOR RUN 4 (REPLICATE) (5 ng)

		Percent of dynamic spike recovered	
		Filter 4006	Back half 4008
Analyte			
^{13}C-1,2,3,4-TCDD	GC/MS	NF[a]	66
^{13}C-1,2,3,4,7,8-HxCDF	GC/MS	NF	89.0
^{13}C-1,2,3,7,8,9-HxCDD	GC/MS	2.4	62
^{13}C-OCDF	GC/MS	NF	76
Method Internal Standards Recovery %			
^{13}C-2,3,7,8-TCDF		76	66
^{13}C-2,3,7,8-TCDD		68	99
^{13}C-1,2,3,7,8-PeCDD		72	71
^{13}C-1,2,3,4,6,7,8-HpCDD		88	92

[a] NF = not found.

TABLE 5-4. RECOVERY OF ^{13}C-LABELED POLYCHLORINATED DIBENZO-*p*-DIOXINS AND DIBENZOFURANS DYNAMICALLY SPIKED INTO THE MM5 TRAIN FOR RUN 5 (500 ng)

		Percent of dynamic spike recovered	
		Filter 5006	Back half 5008
Analyte			
^{13}C-1,2,3,4-TCDD	GC/MS	NF[a]	71
^{13}C-1,2,3,4,7,8-HxCDF	GC/MS	NF	118
^{13}C-1,2,3,7,8,9-HxCDD	GC/MS	NF	101
^{13}C-OCDF	GC/MS	NF	116
Method Internal Standards Recovery %			
^{13}C-2,3,7,8-TCDF		71	b
^{13}C-2,3,7,8-TCDD		68	b
^{13}C-1,2,3,7,8-PeCDD		66	b
^{13}C-1,2,3,4,6,7,8-HpCDD		80	b

[a] NF = not found.

[b] Sample had to be diluted 1/50; surrogate recovery lost.

TABLE 5-5. RECOVERY OF ^{13}C-LABELED POLYCHLORINATED DIBENZO-*p*-DIOXINS AND DIBENZOFURANS DYNAMICALLY SPIKED INTO THE MM5 TRAIN FOR RUN 5 (REPLICATE) (500 ng)

		Percent of dynamic spike recovered	
		Filter 5016	Back half 5018
Analyte			
^{13}C-1,2,3,4-TCDD	GC/MS	NF[a]	49
^{13}C-1,2,3,4,7,8-HxCDF	GC/MS	NF	75
^{13}C-1,2,3,7,8,9-HxCDD	GC/MS	NF	52
^{13}C-OCDF	GC/MS	NF	68
Method Internal Standards Recovery %			
^{13}C-2,3,7,8-TCDF			b
^{13}C-2,3,7,8-TCDD			b
^{13}C-1,2,3,7,8-PeCDD			b
^{13}C-1,2,3,4,6,7,8-HpCDD			b

[a] NF = not found.

[b] Sample had to be diluted 1/50; surrogate recovery lost.

This is critical given the fact that these compounds are highly hydrophobic and tend to readily adsorb to hydrophobic surfaces (i.e., glassware) from aqueous media (i.e., water condensed in the back-half glassware). Once the hydrophobic compounds condense and are solubilized into the water, the driving force to adsorb onto hydrophobic surfaces is the aqueous phase concentration. As the aqueous phase concentration of the chlorinated dioxins and furans increase, adsorption onto glassware surfaces from the aqueous solution increases. Recovery of hydrophobic organic compounds from the glassware surface is often very difficult. Hydrophobic bonding is a result of relatively weak physical forces and one would predict that the compound should be easily recovered using a suitable organic solvent.

Two processes may mitigate recoverability of the spiked compounds. First, water must be thoroughly removed from the glassware surface in order to access adsorption sites. This is usually accomplished by rinsing or recovering the sampling train with a water-miscible solvent for the first rinse. Typically, rinse volumes are kept to a minimum, and the likelihood of efficiently removing all water should be questioned. A minimal rinse with the water-miscible solvent may not remove the water hydrodynamic layer. If not, removal of sorbed dioxins and furans from the glassware surface by a second rinse using a less polar, hydrophobic solvent becomes kinetically limited. Sorbed compounds must migrate through the hydrodynamic boundary layer by diffusion driven by the sorbed phase concentration. This process can be slow, resulting in very poor recovery from the glassware surface. Secondly, should water be efficiently removed from the glassware surface prior to the nonpolar solvent rinse, recovery may still not be quantitative if the surface has active sites. Unsilanized glassware surfaces have sorption sites that are amenable to hydrogen bonding (a chemisorption process) that typically requires a significant input of energy to break. Dioxins and furans may bond to polar glassware surfaces by this process. Solvent rinsing is, after all, not adequate to desorb these sorbates. Either of these two processes, individually or in combination, may create recovery problems.

5.2 FIELD TESTING

5.2.1 Approach

The general experimental approach was to measure the recoveries of specific PCDD and PCDF congeners spiked onto MM5 trains during incineration stack gas sampling. Selected isotopically labeled congeners representing tetrachloro- through octachloro-PCDD and PCDF homologs were spiked onto the XAD-2 resin prior to each test (static spiking) and continuously throughout the test (dynamic spiking). Tests were conducted using three spiked levels: 5, 50, and 500 ng. Following completion of each test, the samples were recovered from the trains and analyzed for the spiked compounds. Recoveries were determined for each spiked compound by comparing the amount recovered versus the spiked amount.

The incinerator stack gases sampled during the tests served only to provide a realistic sample matrix, i.e., flue gas temperature, moisture, and inorganic and organic constituents typical for waste incinerators. Since the samples generated during this study were analyzed only for the spiked compounds and not for actual emissions from the municipal waste incinerator, collection of highly representative samples of the stack gases was not required. Hence, the sampling trains were not traversed during the test runs but were operated at a single, average, velocity point.

The incinerator selected for this study was a mass burn waste combustor burning municipal refuse. Electrostatic precipitators are used to control particulate emissions. Refuse is fed automatically into a reverse reciprocating stoke grate. In addition to the motion of the grates, the underfire grate jet assists in further agitation of the refuse. The unit is operated without auxiliary fuel.

The specific isotopically labeled PCDD and PCDF congeners spiked onto the train are shown in Table 5-1. Table 5-1 also shows the congeners used as method and recovery internal standards, i.e., those spiked into the sample prior to extraction and immediately before analysis. All samples were analyzed by GC/MS.

5.2.2 Experimental Design

The primary assumptions used to construct the experiment design were as follows. A total of 24 tests runs were conducted (six test days with four trains operated each day). The selected PCDD and PCDF congeners were spiked at three levels (5, 50, and 500 ng). Each of the four average velocity points were considered as four replicate sampling locations. It was desirable that a given MM5 train should not be spiked with a lower level following a higher level spike to reduce the potential for carryover between test runs. The possibility exists that test days as well as locations within a stack cross section area should be considered as a blocking factor.

The proposed experiment design is shown in Table 5-6. Each of the individual sampling trains was uniquely identified so they could be tracked to ensure that trains were not selected for low level spikes following a test run at a higher level spike, i.e., to avoid carryover. The proposed design provided for replication of one spike level each test day. Each level was spiked in duplicate on two of the days and once on the other four days. The low level (5 ng) was replicated on the first two days, the second two days had replicates of the mid-level (50 ng), and the final two days had replicates of the high level (500 ng).

The design described in Table 5-6 was developed to allow for isolation and removal of some possible extraneous sources of variation, namely, differences by days or stack location. For each determination, the amount of dioxin found was compared with the amount spiked. The difference between amount found and amount spiked (whether expressed as a difference or a ratio) is a measure of accuracy of the method. The comparison of the replicate conditions (pairs of a level within days) provides a means to estimate the precision of the method. The balance over the days and location allowed the precision of the method to be estimated independently of any possible variation in the incineration conditions that might have existed from day to day.

TABLE 5-6. EXPERIMENTAL DESIGN FOR FIELD EVALUATION TESTING

Stack location	Field spiking level[a] for each test run 6	7	8	9	10	11
1	L	L[b]	M[b]	M[b]	H	H
2	L[c]	M	M[b]	H	H	L
3	M	L[b]	H	L	M	H[d]
4	H	H	L	M[b]	L	M

[a] Field static and dynamic spiking levels: L = low (5 ng); M = medium (50 ng); and H = high (500 ng).

[b] The MM5 train components of these test runs were analyzed individually.

[c] The XAD spike (static) was 50 ng instead of 5 ng.

[d] The XAD spike (static) was 25 ng instead of 500 ng.

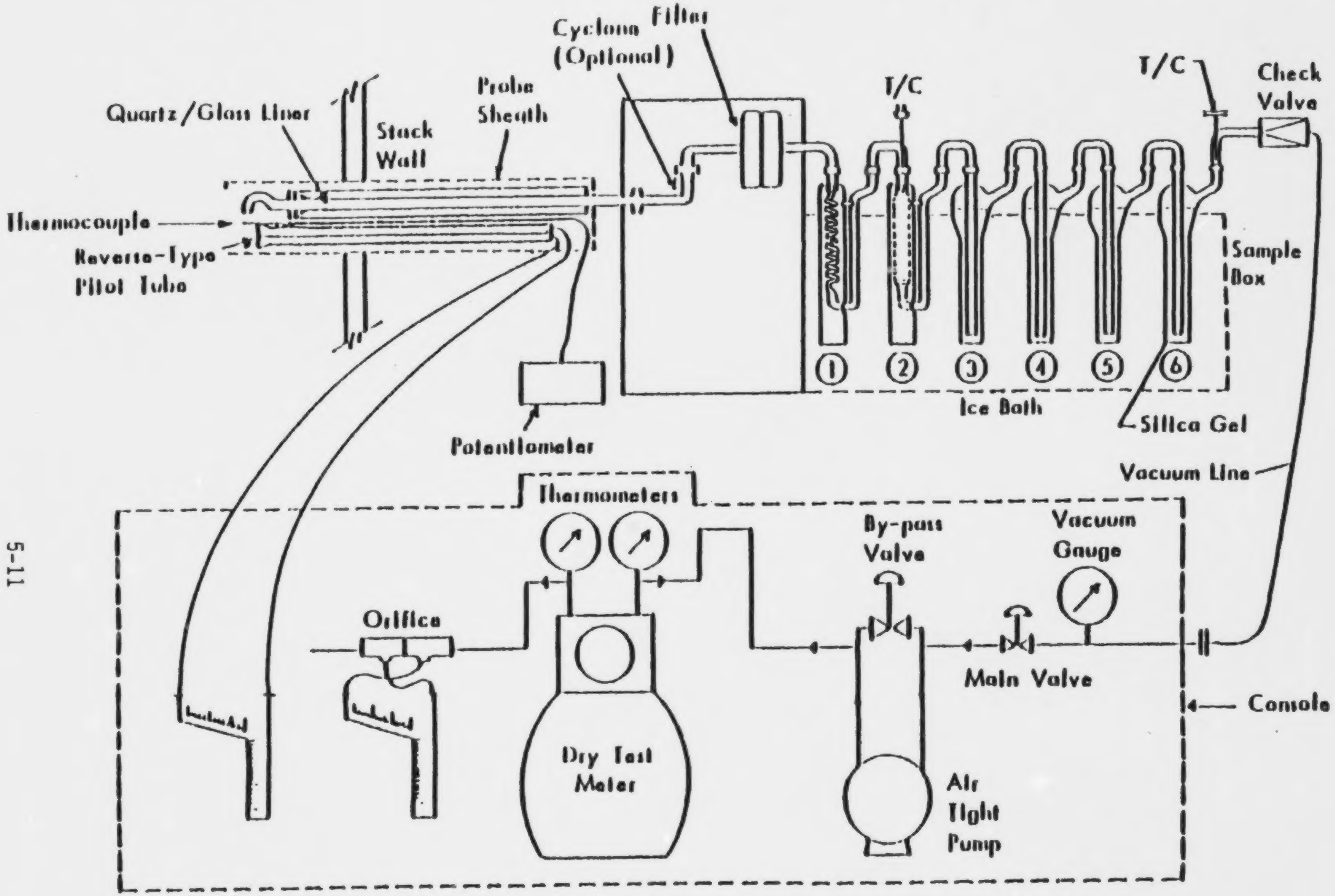
5.2.3 Methods

5.2.3.1 Sampling Methods--

The MM5 sampling system utilized for this study, shown in Figure 5-1, is essentially that described in the draft ASME protocol. The configuration of the condenser and resin cartridges was modified. The water jackets of both components were in the form of impingers. This arrangement makes the condenser and cartridge less vulnerable to breakage and facilitates placement of a thermistor at the inlet of the resin. All glassware joints in the train were glass-to-PTFE seals. Other procedural modifications are as follows:

- Nickel nozzles were used on the probes.

- Borosilicate glass was used for train components.



① Condenser with Ice Water Jacket
② XAD Resin Cartridge with Ice Water Jacket
③ Greenburg-Smith, 100 ml of Double Distilled in Glass H_2O
④ Modified Greenburg-Smith, 100 ml of Double Distilled in Glass H_2O
⑤ Modified Greenburg-Smith, Dry
⑥ Modified Greenburg-Smith, SiO_2

Figure 5-1. MM5 sampling train.

- All references to hexane rinses were changed to methylene chloride rinses.

- Methylene chloride was used in lieu of hexane in the procedure.

- No traversing was performed; samples were collected isokinetically at a single point.

- Blank trains were set up to sample working area ambient air.

- One blank train was recovered each day of the study.

The field static spiking solution, ^{13}C-1,2,3,7,8-PeCDF, was added to the XAD prior to each test. The dynamic spiking solution containing four ^{13}C-labeled PCDD/PCDFs (^{13}C-1,2,3,4,7,8-HxCDF, ^{13}C-OCDF, ^{13}C-1,2,3,4-TCDD, and ^{13}C-1,2,3,7,8,9-HxCDD) was continuously added throughout the test. Tests were conducted using three spiked levels: L = low = 5 ng; M = medium = 50 ng; and H = high = 500 ng (see Tables 5-1 and 5-6). Each level was spiked in duplicate on two of the test days and once on the other four test days. The total mass of labeled analyte spiked onto each MM5 train is shown in Table 5-7.

The sampling trains were not traversed during test runs but were single points: ports 1 and 2 are the left- and right-hand liners in one dual probe. Ports 3 and 4 are in the second dual probe located about 1 ft away laterally. The two trains in each probe had closely matched flow rates, while the two pairs were sampled at flow rates about 30% apart. Each of the four average velocity points can be considered as four replicate sampling locations.

Modified Method 5 sampling was conducted at a location inlet to the control device. Anticipating high particulate loadings, a cyclone separator was installed in the MM5 train directly upstream of the filter. The cyclone catches were prepared for analysis and analyzed as individual samples. All of the MM5 train components were batched and analyzed as a composite for run 6, stack locations 1, 2, 3, and 4; run 7, locations 2 and 4; run 8, locations 3 and 4; run 9, locations 2 and 3; run 10, locations 1, 2, 3, and 4; and run 11,

TABLE 5-7. STATIC AND DYNAMIC SPIKING LEVELS FOR EACH MM5 TRAIN

Run	Stack location	Static spike (ng)	Dynamic spike (ng)
6	1	5	5
	2	50	5
	3	50	50
	4	500	500
7	1	5	5
	2	50	50
	3	5	5
	4	500	500
8	1	50	50
	2	50	50
	3	500	500
	4	5	5
9	1	50	50
	2	500	500
	3	5	5
	4	50	50
10	1	500	500
	2	500	500
	3	50	50
	4	5	5
11	1	500	500
	2	5	5
	3	25	500
	4	50	50

locations 1, 2, 3, and 4. The remaining train components were extracted and analyzed individually.

5.2.3.2 Analysis Methods--

Each sample was analyzed for the specific dioxin and furan congeners noted in Table 5-1. The analyses were conducted in accordance with the draft ASME procedures,* with the exception of some minor changes normally made by MRI as listed below:

- All glassware was thoroughly detergent washed, 5X rinsed in warm tap water, 3X rinsed with distilled water, rinsed with bulk acetone, air dried, and stored until use. Immediately prior to use, all glassware was rinsed with high-purity acetone followed with a 2X rinse with the solvent used in the method. Glassware blanks were collected but not analyzed since no apparent contamination was evident during sample analysis.

- All samples were extracted with dichloromethane (methylene chloride or DCM).

- Aqueous samples were extracted with DCM, according to EPA Method 613, "2,3,7,8-TCDD" (49 FR 43368, October 26, 1984).

- The sample cleanup columns used are different than those specified in the ASME method (reference 1). The columns used were 1 x 10 cm, packed with 1.0 g of silica gel and 4.0 g of 40% w/w sulfuric acid modified silica gel; and 1 x 30 cm, packed with 6.0 g of alumina covered with 1 cm of anhydrous sodium sulfate. The cleanup procedure and sorbent cleaning and preparation procedure are described in detail in the EPA Region VII September 1983 protocol, "Determination of 2,3,7,8-TCDD in Soil and Segment," September 18, 1984.

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* "Analytical Procedures to Assay Stack Effluent Samples and Residual Combustion Products for Polychlorinated Dibenzo-p-dioxins (PCDD) and Polychlorinated Dibenzofurans (PCDF)." A draft ASME analytical protocol dated September 18, 1984.

- For some MM5 samples, only one component of the front half of the sample train and the back half of the sample train was spiked with the internal standards prior to extraction. Since the individual fractions are to be composited prior to analysis, only one component can be spiked in order to evaluate recovery efficiency data. However, a different component from each run was spiked, to provide complete data for all components.

- The HRGC column used by MRI for the analysis was a 60-m DB-5.

The filter samples were initially extracted with DCM, but the amount of dynamic field spikes recovered from the MM5 train was low. The filters were recovered, combined into three batches, reextracted in benzene, and analyzed for PCDD/PCDFs.

5.2.4 Results and Discussion

Percent recovery of field spikes for MM5 train components combined is shown in Table 5-8. Also included are results of the ^{13}C-1,2,3,7,8-pentachlorodibenzofuran spiked directly onto the XAD-2 resin. Recovery of the static spike, i.e., ^{13}C-PCDF, averaged 105%, 100%, 95%, 106%, 96%, and 223% for runs 6 through 11, respectively. Results for run 11 were excessively high and likely resulted from concentration of the static spiking solution between use for runs 10 and 11. However, the results for run 6 through 10 suggest that the XAD-2 resin efficiently retained the static spike during the conduct of the run and that the spike was efficiently removed from the resin by the Soxhlet technique using DCM as the extracting solvent.

Overall recoveries of the dynamically spiked field analytes were low and somewhat variable, averaging 21.7% with a standard deviation of 11.8%. Table 5-9 shows recovery data for some trains by component. Replicate analyses were performed on MM5 train extracts from run 6, stack location 3 and run 7, stack location 2.

TABLE 5-8. VALIDATION ON EMISSION TEST METHOD FOR DIOXINS, PERCENT RECOVERY OF FIELD SPIKES (%)

Run	Stack location	Field spiking analyte	Combined train (%)
6	1	^{13}C-1,2,3,7,8-PeCDF	90.8
		^{13}C-1,2,3,4,7,8-HxCDF	29.8
		^{13}C-OCDF	22.9
		^{13}C-1,2,3,4-TCDD	26.7
		^{13}C-1,2,3,7,8,9-HxCDD	19.9
6	2	^{13}C-1,2,3,7,8-PeCDF	109
		^{13}C-1,2,3,4,7,8-HxCDF	19.3
		^{13}C-OCDF	6.1
		^{13}C-1,2,3,4-TCDD	11.9
		^{13}C-1,2,3,7,8,9-HxCDD	12.7
6	3	^{13}C-1,2,3,7,8-PeCDF	100
		^{13}C-1,2,3,4,7,8-HxCDF	29.9
		^{13}C-OCDF	27.6
		^{13}C-1,2,3,4-TCDD	29.0
		^{13}C-1,2,3,7,8,9-HxCDD	22.7
6	4	^{13}C-1,2,3,7,8-PeCDF	120
		^{13}C-1,2,3,4,7,8-HxCDF	26.5
		^{13}C-OCDF	17.8
		^{13}C-1,2,3,4-TCDD	48.2
		^{13}C-1,2,3,7,8,9-HxCDD	16.3
7	1	^{13}C-1,2,3,7,8-PeCDF	97.8
		^{13}C-1,2,3,4,7,8-HxCDF	34.3
		^{13}C-OCDF	11.8
		^{13}C-1,2,3,4-TCDD	23.3
		^{13}C-1,2,3,7,8,9-HxCDD	26.4
7	2	^{13}C-1,2,3,7,8-PeCDF	90.3
		^{13}C-1,2,3,4,7,8-HxCDF	13.7
		^{13}C-OCDF	19.6
		^{13}C-1,2,3,4-TCDD	37.4
		^{13}C-1,2,3,7,8,9-HxCDD	17.8
7	3	^{13}C-1,2,3,7,8-PeCDF	150
		^{13}C-1,2,3,4,7,8-HxCDF	8.8
		^{13}C-OCDF	0.5
		^{13}C-1,2,3,4-TCDD	12.6
		^{13}C-1,2,3,7,8,9-HxCDD	15.7

(continued)

TABLE 5-8 (continued)

Run	Stack location	Field spiking analyte	Combined train (%)
7	4	^{13}C-1,2,3,7,8-PeCDF	60.7
		^{13}C-1,2,3,4,7,8-HxCDF	9.7
		^{13}C-OCDF	8.2
		^{13}C-1,2,3,4-TCDD	26.1
		^{13}C-1,2,3,7,8,9-HxCDD	9.3
8	1	^{13}C-1,2,3,7,8-PeCDF	91.4
		^{13}C-1,2,3,4,7,8-HxCDF	26.4
		^{13}C-OCDF	9.2
		^{13}C-1,2,3,4-TCDD	31.9
		^{13}C-1,2,3,7,8,9-HxCDD	13.5
8	2	^{13}C-1,2,3,7,8-PeCDF	76.3
		^{13}C-1,2,3,4,7,8-HxCDF	13.0
		^{13}C-OCDF	5.6
		^{13}C-1,2,3,4-TCDD	16.8
		^{13}C-1,2,3,7,8,9-HxCDD	7.2
8	3	^{13}C-1,2,3,7,8-PeCDF	90.8
		^{13}C-1,2,3,4,7,8-HxCDF	28.9
		^{13}C-OCDF	19.4
		^{13}C-1,2,3,4-TCDD	40.4
		^{13}C-1,2,3,7,8,9-HxCDD	15.8
8	4	^{13}C-1,2,3,7,8-PeCDF	123
		^{13}C-1,2,3,4,7,8-HxCDF	27.7
		^{13}C-OCDF	17.8
		^{13}C-1,2,3,4-TCDD	31.7
		^{13}C-1,2,3,7,8,9-HxCDD	21.8
9	1	^{13}C-1,2,3,7,8-PeCDF	128
		^{13}C-1,2,3,4,7,8-HxCDF	30.2
		^{13}C-OCDF	10.8
		^{13}C-1,2,3,4-TCDD	33.2
		^{13}C-1,2,3,7,8,9-HxCDD	14.9
9	2	^{13}C-1,2,3,7,8-PeCDF	101
		^{13}C-1,2,3,4,7,8-HxCDF	25.7
		^{13}C-OCDF	17.3
		^{13}C-1,2,3,4-TCDD	37.1
		^{13}C-1,2,3,7,8,9-HxCDD	15.6

(continued)

TABLE 5-8 (continued)

Run	Stack location	Field spiking analyte	Combined train (%)
9	3	^{13}C-1,2,3,7,8-PeCDF	15.2
		^{13}C-1,2,3,4,7,8-HxCDF	37.2
		^{13}C-OCDF	19.4
		^{13}C-1,2,3,4-TCDD	37.2
		^{13}C-1,2,3,7,8,9-HxCDD	24.9
9	4	^{13}C-1,2,3,7,8-PeCDF	89.6
		^{13}C-1,2,3,4,7,8-HxCDF	45.7
		^{13}C-OCDF	17.6
		^{13}C-1,2,3,4-TCDD	45.9
		^{13}C-1,2,3,7,8,9-HxCDD	26.5
10	1	^{13}C-1,2,3,7,8-PeCDF	114
		^{13}C-1,2,3,4,7,8-HxCDF	21.2
		^{13}C-OCDF	11.2
		^{13}C-1,2,3,4-TCDD	31.1
		^{13}C-1,2,3,7,8,9-HxCDD	10.7
10	2	^{13}C-1,2,3,7,8-PeCDF	107
		^{13}C-1,2,3,4,7,8-HxCDF	12.9
		^{13}C-OCDF	6.8
		^{13}C-1,2,3,4-TCDD	19.7
		^{13}C-1,2,3,7,8,9-HxCDD	7.1
10	3	^{13}C-1,2,3,7,8-PeCDF	104
		^{13}C-1,2,3,4,7,8-HxCDF	18.3
		^{13}C-OCDF	12.6
		^{13}C-1,2,3,4-TCDD	25.8
		^{13}C-1,2,3,7,8,9-HxCDD	10.4
10	4	^{13}C-1,2,3,7,8-PeCDF	57.8
		^{13}C-1,2,3,4,7,8-HxCDF	52.6
		^{13}C-OCDF	38.4
		^{13}C-1,2,3,4-TCDD	49.7
		^{13}C-1,2,3,7,8,9-HxCDD	32.6
11	1	^{13}C-1,2,3,7,8-PeCDF	163*
		^{13}C-1,2,3,4,7,8-HxCDF	13.7
		^{13}C-OCDF	9.2
		^{13}C-1,2,3,4-TCDD	27.1
		^{13}C-1,2,3,7,8,9-HxCDD	7.6

(continued)

TABLE 5-8 (continued)

Run	Stack location	Field spiking analyte	Combined train (%)
11	2	^{13}C-1,2,3,7,8-PeCDF	1140*
		^{13}C-1,2,3,4,7,8-HxCDF	35.2
		^{13}C-OCDF	8.1
		^{13}C-1,2,3,4-TCDD	61.8
		^{13}C-1,2,3,7,8,9-HxCDD	21.7
11	3	^{13}C-1,2,3,7,8-PeCDF	260*
		^{13}C-1,2,3,4,7,8-HxCDF	15.8
		^{13}C-OCDF	10.8
		^{13}C-1,2,3,4-TCDD	23.8
		^{13}C-1,2,3,7,8,9-HxCDD	9.9
11	4	^{13}C-1,2,3,7,8-PeCDF	246*
		^{13}C-1,2,3,4,7,8-HxCDF	17.5
		^{13}C-OCDF	13.3
		^{13}C-1,2,3,4-TCDD	24.6
		^{13}C-1,2,3,7,8,9-HxCDD	10.9

* Static spiking solution integrity was likely not maintained for run 11.

TABLE 5-9. VALIDATION ON EMISSION TEST METHOD FOR DIOXINS, PERCENT RECOVERY OF FIELD SPIKES (%) FOR MM5 TRAIN COMPONENT EXTRACTED INDIVIDUALLY

Run	Stack location	Field spiking analyte	Filter	Front 1/2 rinse	Back 1/2 rinse	XAD	Cyclone
7	1	^{13}C-1,2,3,7,8-PeCDF	0	0	0	97.8	0
		^{13}C-1,2,3,4,7,8-HxCDF	26.2	8.1	0	0	0
		^{13}C-OCDF	7.2	4.6	0	0	0
		^{13}C-1,2,3,4-TCDD	17.2	6.1	0	0	0
		^{13}C-1,2,3,7,8,9-HxCDD	14.2	5.8	2.8	0	3.6
7	3	^{13}C-1,2,3,7,8-PeCDF	0	0	0	150	0
		^{13}C-1,2,3,4,7,8-HxCDF	8.8	0	0	0	0
		^{13}C-OCDF	0.5	0	0	0	0
		^{13}C-1,2,3,4-TCDD	7.1	1.6	3.9	0	0
		^{13}C-1,2,3,7,8,9-HxCDD	6.4	3.8	3.1	0	2.4
8	1	^{13}C-1,2,3,7,8-PeCDF	0	0	0	91.8	0
		^{13}C-1,2,3,4,7,8-HxCDF	19.4	3.3	0.2	2.0	1.5
		^{13}C-OCDF	6.4	1.0	0	0.6	1.2
		^{13}C-1,2,3,4-TCDD	17.0	8.9	0.2	3.1	2.7
		^{13}C-1,2,3,7,8,9-HxCDD	9.3	1.5	0.3	1.4	1.0

(continued)

TABLE 5-9 (continued)

Run	Stack location	Field spiking analyte	Filter	Front 1/2 rinse	Back 1/2 rinse	XAD	Cyclone
8	2	^{13}C-1,2,3,7,8-PeCDF	0	0	0	76.3	0
		^{13}C-1,2,3,4,7,8-HxCDF	0.6	5.7	3.8	2.9	0
		^{13}C-OCDF	0.1	2.2	2.4	0.9	0
		^{13}C-1,2,3,4-TCDD	0.3	7.4	4.3	4.8	0
		^{13}C-1,2,3,7,8,9-HxCDD	0.6	2.5	2.0	2.1	0
9	1	^{13}C-1,2,3,7,8-PeCDF	0	0	0	128	0
		^{13}C-1,2,3,4,7,8-HxCDF	23.8	4.8	0.2	1.4	0
		^{13}C-OCDF	8.6	1.7	0	0.5	0
		^{13}C-1,2,3,4-TCDD	19.5	9.4	0	4.3	0
		^{13}C-1,2,3,7,8,9-HxCDD	11.6	2.3	0.2	0.8	0.1
9	4	^{13}C-1,2,3,7,8-PeCDF	0	0	0	89.6	0
		^{13}C-1,2,3,4,7,8-HxCDF	39.9	2.5	0.3	3.0	0
		^{13}C-OCDF	16.0	1.0	0.0	0.6	0
		^{13}C-1,2,3,4-TCDD	33.4	7.0	0.3	5.2	0
		^{13}C-1,2,3,7,8,9-HxCDD	22.6	1.3	0.4	1.9	0.1

These data are shown in Table 5-10 and indicate a high degree of precision in GC/MS analysis.

TABLE 5-10. REPLICATE GC/MS ANALYSIS OF MM5 EXTRACTS

Run	Stack location	Field spiking analyte	Percent combined train	Recovered replicate
6	3	^{13}C-1,2,3,7,8-PeCDF	100	103
		^{13}C-1,2,3,4,7,8-HxCDF	29.9	27.0
		^{13}C-OCDF	27.6	30.5
		^{13}C-1,2,3,4-TCDD	29.0	30.0
		^{13}C-1,2,3,7,8,9-HxCDD	22.7	21.2
7	2	^{13}C-1,2,3,7,8-PeCDF	96.3	77.3
		^{13}C-1,2,3,4,7,8-HxCDF	13.7	11.9
		^{13}C-OCDF	19.6	17.4
		^{13}C-1,2,3,4-TCDD	37.4	34.4
		^{13}C-1,2,3,7,8,9-HxCDD	17.4	15.8

The recoveries of method internal standards, i.e., analytes spiked into samples immediately prior to sample extraction, were acceptable. The mean and percent relative standard deviation for these surrogates are tabulated in Table 5-11. Recoveries reported for the front-half rinse component were low. The remaining recoveries were within 100% ± 50%.

The primary observations from the results from runs 6 through 11 are as follows:

1. The method internal standard recoveries indicate that the analysis results reliably determine PCDDs and PCDFs in sample components recovered from the trains.
2. The recoveries for the PeCDF static spike from the XAD cartridges indicate that the XAD effectively retains PCDDs and PCDFs.

TABLE 5-11. VALIDATION ON EMISSION TEST METHOD FOR DIOXINS, PERCENT RECOVERY OF METHOD INTERNAL STANDARDS

Run	Lab spiking analyte	Filter	Front 1/2 rinse	Back 1/2 rinse	XAD	Cyclone	Condensate
Average (6-11)	^{13}C-2,3,7,8-TCDF	100	37.0	73.4	93.7	50.6	80.1
	^{13}C-2,3,7,8-TCDD	91.0	28.9	79.2	84.5	51.5	77.1
	^{13}C-1,2,3,7,8-PeCDD	103	50.0	81.0	91.7	62.7	85.9
	^{13}C-1,2,3,4,6,7,8-HpCDD	81.2	41.0	65.9	86.3	61.6	77.7
% RSD (6-11)	^{13}C-2,3,7,8-TCDF	14.5	11.3	35.8	16.1	68.8	13.8
	^{13}C-2,3,7,8-TCDD	17.9	37.7	48.4	16.6	71.5	16.0
	^{13}C-1,2,3,7,8-PeCDD	18.4	20.1	24.5	14.5	61.7	14.9
	^{13}C-1,2,3,4,6,7,8-HpCDD	17.3	29.5	46.5	18.1	74.6	19.6

3. The total recoveries for the dynamic spike compounds were generally low and somewhat variable.

4. The largest fraction of dynamic spike compounds recovered were found on the filter.

Given these observations, namely, that the recovery of field spiked analytes were low and laboratory surrogate recoveries were acceptable, the investigator is unable to interpret the data to explain low recoveries of field spikes. These results offer an example of a situation wherein the chemical or physical behavior of the target analyte cannot be predicted from laboratory data. These data suggest that for many of the components, i.e., the filter XAD-2 resin, and back-half rinse, recovery of the field spikes should be in the order of 70% to 90%. The majority of analytes spiked into the sampling train during a run were impinged on the filter, suggesting that gas phase adsorption of spiked analytes was a thermodynamically favorable physical process occurring during the sampling event. In the laboratory, surrogates were spiked onto the filter component in a solvent and then extracted. In this example, surrogate spiking should only be used to indicate method accuracy and not absolute accuracy, i.e., extractability of field spiked surrogate.

Based on these observations and the results of the Phase 1 laboratory studies, it is reasonable to conclude that a significant portion of the dynamic spike compounds was condensed ahead of the XAD cartridge (on the filter, front half, and/or back half) but was not effectively recovered from the train.

As noted in Section 5.2.3, all samples were extracted with methylene chloride and analyzed by GC/MS-SIM. Since most of the field spiked analytes were found on MM5 filter, an attempt was made to recover more of the spiked compounds by retrieving wasted filters and reextracting with benzene. Filters were batched and Soxhlet extracted for 16 h and analyzed for target analytes. These results are shown in Table 5-12. The overall recovery including the amount found in the benzene extracts increased 21.7% to 26.0%. Since the filters were batched, the data presented in Table 5-12 reflect the total

TABLE 5-12. VALIDATION ON EMISSION TEST METHOD FOR DIOXINS
(TOTAL AMOUNT OF ^{13}C-FIELD SURROGATE RECOVERED)

Field spike	Amount added (ng)	Amount found ($MeCl_2$) (ng)	% of Total found in $MeCl_2$) ext. (%)	Amount found (benzene) (ng)	% of Total found in benzene ext. (%)	Total found $MeCl_2$ + benzene (ng)	% Found $MeCl_2$ + benzene (%)
^{13}C-1,2,3,7,8-HxCDF	4440	892	20	273	6.8	1060	26
^{13}C-OCDF	4440	572	13	304	7.6	824	20
^{13}C-1,2,3,4-TCDD	4173	1320	32	384	10.2	1600	41
^{13}C-1,2,3,7,8,9-HxCDD	4440	539	12	237	5.9	728	17

amount of each field analyte spiked and recovered from the entire study and should only be used to suggest the appropriateness of methylene chloride as an extraction solvent for particulate matter. The absolute increase in percent recovered is not indicated in these data since the integrity of filters was not maintained after the methylene chloride extraction. However, the data do suggest that a π-bonded solvent such as benzene or toluene may be a more appropriate extraction solvent for particulate matter.

SECTION 6.0

PHASE 3--INVESTIGATION OF THE INFLUENCE OF CARBON CONTENT AND EXTRACTING SOLVENT ON PCDD AND PCDF RECOVERY FROM MUNICIPAL WASTE COMBUSTOR ASH

6.1 BACKGROUND

Low recoveries of PCDD surrogate compounds have been observed for some municipal refuse incinerator emission tests, especially in the particulate catch of the MM5 sampling train. In the most recent case, the MM5 filter catch appeared to contain considerable unburned carbon, i.e., soot. Hence, it has been suggested that extraction of PCDDs and PCDFs may be inhibited by unburned carbon. The study described below was designed to investigate the influence of unburned carbon on PCDD and PCDF extraction by typically used solvents.

6.2 APPROACH

An extraction efficiency study was conducted using electrostatic precipitator hopper ashes collected from two municipal refuse incinerators and augmented with carbon black. Ashes were selected from incinerators with relatively high concentrations of PCDDs and PCDFs. The carbon content from the ultimate fuels analysis was 6.53% and 12.76% for ashes designated Ash No. 1 and Ash No. 2, respectively. Aliquots of each ash were augmented with carbon black to produce ashes with carbon contents of 6.5%, 16.5%, and 26.5% for the East Coast fly ash composite and 12.8%, 32.5%, and 32.8% for the Philadelphia Northwest No. 1 fly ash composite.

Duplicate aliquots of the original and carbon-augmented ash were spiked with PCDD and PCDF surrogate compounds as shown in Table 6-1. Spiked samples

TABLE 6-1. LABELED PCDDs AND PCDFs USED IN THE ASH RECOVERY STUDY

	Spiking level (ng/mL)
Spiked on ash	
^{13}C-1,2,3,4-TCDD	50
^{13}C-1,2,3,4,7,8-HxCDD	200
^{13}C-1,2,3,4,7,8-HxCDF	200
^{13}C-OCDD	500
^{13}C-OCDF	500
Spiked on cleanup column	
^{13}C-2,3,7,8-TCDD	50
^{13}C-2,3,7,8-TCDF	50
^{13}C-1,2,3,7,8-PeCDD	50
^{13}C-1,2,3,6,7,8-HxCDD	200
^{13}C-1,2,3,4,6,7,8-HpCDD	200
Recovery internal standards	
^{13}C-1,2,3,7,8-PeCDF	50
^{13}C-1,2,3,4,6,7,8-HpCDF	200

were equilibrated in a tumbler for 1 h and Soxhlet-extracted. Extracts were analyzed by GC/MS-SIM to determine native tetra- through octachloro congeners and recoveries of the ^{13}C-labeled spiked surrogates. The investigation was conducted using three extraction solvents: toluene, benzene, and dichloromethane (DCM).

6.3 EXPERIMENTAL DESIGN

The purpose of the experiment was to investigate the effect of unburned carbon content on the recovery of PCDDs and PCDFs from municipal refuse incinerator fly ash for a variety of extraction solvents. Two composite samples were used in the study. Each ash sample was augmented with unburned carbon as noted in Section 6.2, spiked with surrogates, extracted, and analyzed.

The experimental design had three factors: ash type, carbon level and extraction solvent. Carbon was added to the native ashes at levels equally spaced. Depending on the ash effect, a good estimate of possible effects of carbon from zero to 30% may be realized. To guard against possible time effects, both sample preparation (extraction and extract cleanup) and GC/MS analysis were balanced over time. A randomized order for sample preparation was developed which included one from each level of carbon content, solvent and ash type. A separate randomized order was used for GC/MS analysis. A 3 x 3 Latin square design was used within each ash type to achieve randomization and balance. Sample preparation and analysis randomization schemes to study carbon effects are shown in Tables 6-2 and 6-3, respectively.

6.4 SAMPLE PREPARATION AND ANALYSIS

Two ash samples were selected, one with 6.5% carbon content (East Coast composite) and one with 13% carbon content (Philadelphia NW No. 1). Replicate (2) extractions and analyses were performed for each of three solvents (methylene chloride, benzene, and toluene). Soot (carbon black) was added to each ash sample to bring the total carbon content to 10% and 20% more than the original content. The soot amended samples were also extracted in replicate (2) using the three solvents indicated above. Prior to extraction, each ash aliquot was spiked with the isotopically labeled PCDD and PCDF congeners shown in Table 6-1.

6.5 SAMPLE ANALYSIS

All samples were Soxhlet extracted and analyzed for the spiked compounds and native tetra- through octachloro-PCDD and PCDF homologs using the procedures described in the draft ASME protocol,* with minor exceptions

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* "Analytical Procedures to Assay Stack Effluent Samples and Residual Combustion Products for Polychlorinated Dibenzo-*p*-dioxins (PCDD) and Polychlorinated Dibenzofurans (PCDF)." A Draft ASME analytical protocol dated September 18, 1984.

TABLE 6-2. RANDOMIZATION SCHEME FOR CARBON EFFECTS SAMPLE PREPARATION

Day	Order	Solvent	Carbon level	Ash type
1	1	Toluene	L	2
	2	DCM	M	2
	3	DCM	H	1
	4	Toluene	M	1
	5	Benzene	L	1
	6	Benzene	H	2
2	1	Toluene	M	2
	2	Benzene	L	2
	3	Benzene	M	1
	4	Toluene	H	1
	5	DCM	L	1
	6	DCM	H	2
3	1	Benzene	M	2
	2	Toluene	L	1
	3	DCM	L	2
	4	Benzene	H	1
	5	DCM	M	1
	6	Toluene	H	2
4	1	Benzene	L	1
	2	DCM	H	1
	3	DCM	M	2
	4	Toluene	L	2
	5	Toluene	M	1
	6	Benzene	H	2
5	1	Benzene	M	2
	2	Benzene	H	1
	3	DCM	L	2
	4	DCM	M	1
	5	Toluene	L	1
	6	Toluene	H	2
6	1	Toluene	H	1
	2	DCM	H	2
	3	DCM	L	1
	4	Toluene	M	2
	5	Benzene	L	2
	6	Benzene	M	1

TABLE 6-3. RANDOMIZATION SCHEME FOR CARBON EFFECTS SAMPLE ANALYSIS

Day	Order	Solvent	Carbon level	Ash type
1	1	Toluene	L	1
	2	DCM	M	1
	3	Benzene	M	2
	4	DCM	L	2
	5	Toluene	H	2
	6	Benzene	H	1
2	1	Toluene	H	1
	2	DCM	H	2
	3	Benzene	L	2
	4	Benzene	M	1
	5	Toluene	M	2
	6	DCM	L	1
3	1	Toluene	L	2
	2	Toluene	M	1
	3	DCM	M	2
	4	DCM	H	1
	5	Benzene	H	2
	6	Benzene	L	1
4	1	Toluene	M	2
	2	DCM	H	2
	3	Benzene	L	2
	4	Toluene	H	1
	5	Benzene	M	1
	6	DCM	L	1
5	1	DCM	H	1
	2	Benzene	H	2
	3	Benzene	L	1
	4	DCM	M	2
	5	Toluene	M	1
	6	Toluene	L	2
6	1	Toluene	H	2
	2	Benzene	M	2
	3	Benzene	H	1
	4	DCM	M	1
	5	Toluene	L	1
	6	DCM	L	2

appropriate for this study and normally employed by MRI. These exceptions are listed below:

- All glassware was thoroughly detergent-washed, 5x rinsed in warm tap water, 3x rinsed with distilled water, rinsed with bulk acetone, air dried, and stored until use. Immediately prior to use, glassware was rinsed with high purity acetone followed with a 2x rinse with the solvent used in the method.

- Samples were extracted with methylene chloride (DCM), benzene, or toluene.

- The sample cleanup columns used are different that those specified in the ASME method. The columns used were 1 x 10 cm, paced with 1.0 g of silica gel and 4.0 g of 40% w/w sulfuric acid modified silica gel; and 1 x 30 cm, packed with 6.0 g of alumina covered with 1 cm of anhydrous sodium sulfate. The cleanup procedure and sorbent cleaning and preparation procedure are provided in detail in the EPA Region VII September 1983 protocol, "Determination of 2,3,7,8-TCDD in soil and sediment."

- The dioxin and furan standards used are specified in Table 6-4.

6.6 RESULTS AND DISCUSSION

Results of each ^{13}C-PCDD/PCDF spiked onto the East Coast composite fly ash samples prior to sample preparation are listed in Tables 6-5 through 6-9. Results for the Philadelphia Northwest incinerator fly ash are presented in Tables 6-10 through 6-14. The carbon level for each ash type is noted, and the percents of spike recovered for each extraction solvent are listed in these tables.

TABLE 6-4. CONCENTRATIONS OF CONGENERS IN PCDD/PCDF CALIBRATION STANDARDS, METHOD INTERNAL STANDARDS (SURROGATES), AND RECOVERY INTERNAL STANDARDS FOR SIM ANALYSIS (ng/mL)

Compound Native (calibration standards)	Calibration solutions (ng/mL) DF5 (5-25)	 DF10 (10-50)	 DF100 (100-500)	 DF500 (500-2,500)
2,3,7,8-TCDF*	4.98 (0.1)	9.96 (0.2)	99.6 (2)	498 (10)
2,3,7,8-TCDD*	4.96 (0.1)	9.92 (0.2)	99.2 (2)	496 (10)
1,2,3,7,8-PeCDF*	5.01 (0.1)	10.0 (0.2)	100 (2)	501 (10)
2,3,4,7,8-PeCDF	4.96 (0.1)	9.92 (0.2)	99.2 (2)	496 (10)
1,2,3,7,8-PeCDD*	5.06 (0.1)	10.1 (0.2)	101 (2)	506 (10)
1,2,3,4,7,8-HxCDF	12.3 (0.063)	24.6 (0.125)	246 (1.25)	1,235 (6.3)
1,2,3,6,7,8-HxCDF	12.3 (0.063)	24.6 (0.125)	246 (1.25)	1,233 (6.3)
2,3,4,6,7,8-HxCDF*	12.6 (0.063)	25.2 (0.125)	252 (1.25)	1,256 (6.3)
1,2,3,7,8,9-HxCDF	12.3 (0.063)	24.6 (0.125)	246 (1.25)	1,230 (6.3)
1,2,3,4,7,8-HxCDD	12.2 (0.063)	24.4 (0.125)	244 (1.25)	1,219 (6.3)
1,2,3,6,7,8-HxCDD	12.7 (0.063)	25.4 (0.125)	254 (1.25)	1,268 (6.3)
1,2,3,7,8,9-HxCDD*	12.7 (0.063)	25.4 (0.125)	254 (1.25)	1,268 (6.3)
1,2,3,4,6,7,8-HpCDF*	12.5 (0.063)	24.9 (0.125)	249 (1.25)	1,246 (6.3)
1,2,3,4,7,8,9-HpCDF	12.5 (0.063)	25.0 (0.125)	250 (1.25)	1,250 (6.3)
1,2,3,4,6,7,8-HpCDD*	12.4 (0.063)	24.9 (0.125)	249 (1.25)	1,244 (6.3)
OCDF*	24.6 (0.05)	49.2 (0.1)	492 (1)	2,459 (10)
OCDD*	24.4 (0.05)	48.8 (0.1)	488 (1)	2,442 (10)

(continued)

TABLE 6-4. (continued)

Compound Native (calibration standards)	Calibration solutions (ng/mL) DF5 (5-25)	DF10 (10-50)	DF100 (100-500)	DF500 (500-2,500)
Stable isotopes (ASH method internal standards)				
^{13}C-1,2,3,4,7,8-HxxCDF	100	200	200	200
^{13}C-OCDF	200	200	1,000	1,000
^{13}C-1,2,3,4-TCDD	47.0	47.0	47.0	47.0
^{13}C-1,2,3,7,8,9-HxCDD	200	200	200	200
^{13}C-OCDD	500	500	500	500
Stable isotopes (column method internal standards)				
^{13}C-2,3,7,8-TCDF	50.0	50.0	50.0	50.0
^{13}C-2,3,7,8-TCDD	50.0	50.0	50.0	50.0
^{13}C-1,2,3,7,8-PeCDD	50.0	50.0	50.0	50.0
^{13}C-1,2,3,6,7,8-HxCDD	200	200	200	200
^{13}C-1,2,3,4,6,7,8-HpCDD	200	200	200	200
Recovery internal standards				
^{13}C-1,2,3,7,8-PCDF	100	100	100	100
^{13}C-1,2,3,4,6,7,8-HpCDF	400	400	400	400

* = The isomer used to quantitate each analyte.

() = The ratio of the concentration of the native calibration standard to the concentration of the stable-isotopically labeled method internal standard.

TABLE 6-5. RECOVERY OF ^{13}C-1,2,3,4,7,8-HxCDF SPIKED ONTO ASH SAMPLE FROM EAST COAST COMPOSITE

Percent carbon[a]	Percent of spike recovered[b]		
	DCM	Benzene	Toluene
6.5R1	12	69	74
6.5R2	32	94	102
$\bar{X}$	22	81	88
RPD %	90	31	32
17R1	62	69	39
17R2	85	87	111
$\bar{X}$	74	78	75
RPD %	30	23	96
27R1	70	67*	93
27R2	78	92	94
$\bar{X}$	74	80	93
RPD %	11	31	2

[a] R1 = Replicate 1, R2 = Replicate 2.

[b] Spike level = 5.0 ng, final volume = 25 μL.

* $\bar{X}$ of two replicate analysis.

TABLE 6-6. RECOVERY OF ^{13}C-OCDF SPIKED ONTO ASH SAMPLE FROM EAST COAST COMPOSITE

Percent carbon[a]	Percent of spike recovered[b*]		
	DCM	Benzene	Toluene
6.5R1	6	68	70
6.5R2	19	81	87
$\bar{X}$	13	74	79
RPD %	101	18	22
17R1	48	66	33
17R2	56	91	107
$\bar{X}$	52	78	70
RPD %	16	32	105
27R1	73	61**	95
27R2	56	83	82
$\bar{X}$	65	72	88
RPD %	28	30	15

[a] R1 = Replicate 1, R2 = Replicate 2.

[b] Spike level = 12.5 ng, final volume = 25 µL.

* Theoretical calculation.

** $\bar{X}$ of two replicate analysis.

TABLE 6-7. RECOVERY OF ^{13}C-1,2,3,4-TCDD SPIKED ONTO ASH SAMPLE FROM EAST COAST COMPOSITE

Percent carbon[a]	Percent of spike recovered[b]		
	DCM	Benzene	Toluene
6.5R1	31	75	63
6.5R2	55	108	98
$\bar{X}$	43	91	81
RPD %	58	36	43
17R1	74	67	55
17R2	94	97	115
$\bar{X}$	84	82	85
RPD %	24	37	70
27R1	68	74*	91
27R2	85	96	86
$\bar{X}$	76	85	89
RPD %	22	27	6

[a] R1 = Replicate 1, R2 = Replicate 2.

[b] Spike level = 1.18 ng, final volume = 25 µL.

* $\bar{X}$ of two replicate analysis.

TABLE 6-8. RECOVERY OF ^{13}C-1,2,3,7,8,9-HxCDD SPIKED ONTO ASH SAMPLE FROM EAST COAST COMPOSITE

Percent carbon[a]	Percent of spike recovered[b]		
	DCM	Benzene	Toluene
6.5R1	62	70	75
6.5R2	15	84	100
$\bar{X}$	39	77	98
RPD %	122	18	29
17R1	53	66	37
17R2	67	89	106
$\bar{X}$	60	78	69
RPD %	24	30	106
27R1	70	67*	93
27R2	62	90	96
$\bar{X}$	66	78	95
RPD %	12	30	3

[a] R1 = Replicate 1, R2 = Replicate 2.

[b] Spike level = 5.0 ng, final volume = 25 μL.

* $\bar{X}$ of two replicate analysis.

TABLE 6-9. RECOVERY OF ^{13}C-OCDD SPIKED ONTO ASH SAMPLE FROM EAST COAST COMPOSITE

	Percent of spike recovered[b]		
Percent carbon[a]	DCM	Benzene	Toluene
6.5R1	6	75	86
6.5R2	21	90	108
$\bar{X}$	14	83	97
RPD %	106	18	23
17R1	57	76	35
17R2	68	109	124
$\bar{X}$	63	92	80
RPD %	18	35	112
27R1	85	76*	102
27R2	58	101	98
$\bar{X}$	71	89	100
RPD %	38	29	4

[a] R1 = Replicate 1, R2 = Replicate 2.

[b] Spike level = 12.5 ng, final volume = 25 µL.

* $\bar{X}$ of two replicate analysis.

TABLE 6-10. RECOVERY OF ^{13}C-1,2,3,4,7,8-HxCDF SPIKED ONTO ASH SAMPLE FROM PHILADELPHIA NORTHWEST NO. 1 INCINERATOR

	Percent of spike recovered[b]		
Percent carbon[a]	DCM	Benzene	Toluene
13R1	7	82	70
13R2	9	75	93
$\bar{X}$	8	79	81
RPD %	21	9	29
23R1	71	65	78
23R2	48	98	62
$\bar{X}$	59	81	70
RPD %	38	41	23
33R1	34	76*	77
33R2	45	87**	103
$\bar{X}$	40	82	90
RPD %	28	13	29

[a] R1 = Replicate 1, R2 = Replicate 2.

[b] Spike level = 5.0 ng, final volume = 25 µL.

* $\bar{X}$ of two replicate analysis.

** RIS added at 1/2 normal amount.

TABLE 6-11. RECOVERY OF ^{13}C-OCDF SPIKED ONTO ASH SAMPLE FROM PHILADELPHIA NORTHWEST NO. 1 INCINERATOR

	Percent of spike recovered[b][*]		
Percent carbon[a]	DCM	Benzene	Toluene
13R1	5	54	72
13R2	5	46	70
$\bar{X}$	5	50	71
RPD %	0	17	2
23R1	66	57	66
23R2	27	66	52
$\bar{X}$	47	61	59
RPD %	82	15	23
33R1	17	68**	53
33R2	24	78***	79
$\bar{X}$	20	73	66
RPD %	35	14	38

[a] R1 = Replicate 1, R2 = Replicate 2.

[b] Spike level = 12.5 ng, final volume = 25 µL.

* Theoretical calculation.

** $\bar{X}$ of two replicate analysis.

*** RIS added at 1/2 normal amount.

TABLE 6-12. RECOVERY OF ^{13}C-1,2,3,4-TCDD SPIKED ONTO ASH SAMPLE FROM PHILADELPHIA NORTHWEST NO. 1 INCINERATOR

Percent carbon[a]	Percent of spike recovered[b] DCM	Benzene	Toluene
13R1	17	85	75
13R2	20	75	88
$\bar{X}$	18	80	81
RPD %	17	12	16
23R1	82	67	73
23R2	73	92	57
$\bar{X}$	78	79	65
RPD %	13	32	25
33R1	67	76*	82
33R2	67	83**	96
$\bar{X}$	67	80	89
RPD %	0	10	16

---

[a] R1 = Replicate 1, R2 = Replicate 2.

[b] Spike level = 1.18 ng, final volume = 25 µL.

* $\bar{X}$ of two replicate analysis.

** RIS added at 1/2 normal amount.

TABLE 6-13. RECOVERY OF ^{13}C-1,2,3,7,8,9-HxCDD SPIKED ONTO ASH SAMPLE FROM PHILADELPHIA NORTHWEST NO. 1 INCINERATOR

Percent carbon[a]	Percent of spike recovered[b]		
	DCM	Benzene	Toluene
13R1	6	71	75
13R2	9	68	75
$\overline{X}$	8	69	75
RPD %	43	4	0
23R1	62	66	79
23R2	31	88	65
$\overline{X}$	47	77	72
RPD %	67	29	20
33R1	21	76*	80
33R2	27	87**	99
$\overline{X}$	24	81	90
RPD %	25	13	22

[a] R1 = Replicate 1, R2 = Replicate 2.

[b] Spike level = 5.0 ng, final volume = 25 µL.

* $\overline{X}$ of two replicate analysis.

** RIS added at 1/2 normal amount.

TABLE 6-14. RECOVERY OF ^{13}C-OCDD SPIKED ONTO ASH SAMPLE FROM PHILADELPHIA NORTHWEST NO. 1 INCINERATOR

Percent carbon[a]	Percent of spike recovered[b]		
	DCM	Benzene	Toluene
13R1	5	61	80
13R2	5	51	91
$\overline{X}$	5	56	85
RPD %	2	18	14
23R1	70	68	74
23R2	32	76	62
$\overline{X}$	51	72	68
RPD %	74	13	18
33R1	18	77*	78
33R2	27	89**	94
$\overline{X}$	23	83	86
RPD %	44	15	19

[a] R1 = Replicate 1, R2 = Replicate 2.

[b] Spike level = 12.5 ng, final volume = 25 µL.

* $\overline{X}$ of two replicate analysis.

** RIS added at 1/2 normal amount.

6.6.1 Results for the ^{13}C-Labeled Surrogates Spiked Onto Native Ash Samples

These data indicate that toluene or benzene more efficiently extract the labeled surrogates from each type of ash compared to dichloromethane. Recoveries of ^{13}C-PCDDs/PCDFs from the native East Coast ash sample ranged from 6% to 62% for dichloromethane, from 68% to 108% for benzene, and from 63% to 108% for toluene. Similarly, recoveries from the native Philadelphia ash sample ranged from 5% to 20% for dichloromethane, from 46% to 85% for benzene, and from 70% to 93% for toluene. Recovery of surrogates from the carbon-amended ashes is difficult to review in a tabular format. These recoveries are displayed in figures and are discussed in Section 6.6.2.

Precision data, also shown in the tables, were calculated for each replicate determination as the relative percent difference. The average relative percent difference for all preparations of the East Coast ash sample was 40% with a standard deviation of 33%, and 22% with a standard deviation of 18% for the Philadelphia ash sample. Since sample preparation and sample analysis were completely randomized across the three variables (i.e., ash type, percent carbon, and extraction solvent), this strongly suggests that overall extractability of dioxins and furans from ash may be ash-dependent.

Recall from Section 6.4 that ^{13}C-PCDDs/PCDFs were also spiked directly onto adsorption chromatography columns before the ash extracts were cleaned up. Recovery of these surrogates is indicative of sample preparation and analysis performance from the cleanup step through sample analysis. These data are presented in Tables 6-15 through 6-19 for the East Coast fly ash sample and in Tables 6-20 through 6-24 for the Philadelphia fly ash sample. For each labeled surrogate, recovery is presented for each extraction solvent as a function of percent carbon. These recovery values are much higher than values reported for the surrogates spiked directly onto the ash sample prior to extraction. Since the surrogates spiked into the ash were quantitated using the method internal standards, their recoveries are corrected for any losses of the method internal standards. Hence, the recoveries of the surrogates (Tables 6-5 through 6-14) spiked onto the ash samples should reflect only the extractability of each solvent.

TABLE 6-15. RECOVERY OF ^{13}C-2,3,7,8-TCDF SPIKED ONTO CLEANUP COLUMN FROM EAST COAST COMPOSITE

Percent carbon[a]	Percent of spike recovered[b] DCM	Benzene	Toluene
6.5R1	93	86	65
6.5R2	99	112	104
$\bar{X}$	96	99	85
RPD %	6	27	46
17R1	78	79	90
17R2	110	104	134
$\bar{X}$	94	92	112
RPD %	34	28	39
27R1	87	78*	98
27R2	102	99	100
$\bar{X}$	94	89	99
RPD %	16	24	2
Total $\bar{X}$	95	93	99
Total RSD %	12	15	23

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[a] R1 = Replicate 1, R2 = Replicate 2.

[b] Spike level = 1.25 ng, final volume = 25 μL.

* $\bar{X}$ of two replicate analysis.

TABLE 6-16. RECOVERY OF ^{13}C-2,3,7,8-TCDD SPIKED ONTO CLEANUP COLUMN FROM EAST COAST COMPOSITE

Percent carbon[a]	Percent of spike recovered[b]		
	DCM	Benzene	Toluene
6.5R1	78	63	61
6.5R2	83	93	79
$\bar{X}$	80	78	70
RPD %	6	39	25
17R1	69	63	74
17R2	90	90	111
$\bar{X}$	80	77	92
RPD %	26	36	40
27R1	71	69*	83
27R2	83	81	79
$\bar{X}$	77	75	81
RPD %	15	16	5
Total $\bar{X}$	79	77	81
Total RSD %	10	18	20

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[a] R1 = Replicate 1, R2 = Replicate 2.

[b] Spike level = 1.25 ng, final volume = 25 µL.

* $\bar{X}$ of two replicate analysis.

TABLE 6-17. RECOVERY OF ^{13}C-1,2,3,7,8-PeCDD SPIKED ONTO CLEANUP COLUMN FROM EAST COAST COMPOSITE

	Percent of spike recovered[b]		
Percent carbon[a]	DCM	Benzene	Toluene
6.5R1	84	71	88
6.5R2	95	83	97
$\bar{X}$	89	77	92
RPD %	12	15	10
17R1	93	71	85
17R2	103	108	115
$\bar{X}$	98	89	100
RPD %	11	41	30
27R1	92	86*	97
27R2	93	93	90
$\bar{X}$	92	90	94
RPD %	1	8	7
Total $\bar{X}$	93	85	95
Total RSD %	7	16	11

[a] R1 = Replicate 1, R2 = Replicate 2.

[b] Spike level = 1.25 ng, final volume = 25 µL.

* $\bar{X}$ of two replicate analysis.

TABLE 6-18. RECOVERY OF ^{13}C-1,2,3,6,7,8-HxCDD SPIKED ONTO CLEANUP COLUMN FROM EAST COAST COMPOSITE

Percent carbon[a]	Percent of spike recovered[b]		
	DCM	Benzene	Toluene
6.5R1	69	66	69
6.5R2	86	86	87
$\bar{X}$	78	76	78
RPD %	21	27	23
17R1	70	65	81
17R2	91	86	99
$\bar{X}$	80	76	90
RPD %	26	27	20
27R1	73	68*	89
27R2	86	79	83
$\bar{X}$	80	73	86
RPD %	16	15	8
Total $\bar{X}$	79	75	85
Total RSD %	12	13	12

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[a] R1 = Replicate 1, R2 = Replicate 2.

[b] Spike level = 5.0 ng, final volume = 25 μL.

* $\bar{X}$ of two replicate analysis.

TABLE 6-19. RECOVERY OF ^{13}C-1,2,3,4,6,7,8-HpCDD SPIKED ONTO CLEANUP COLUMN FROM EAST COAST COMPOSITE

	Percent of spike recovered[b]		
Percent carbon[a]	DCM	Benzene	Toluene
6.5R1	82	83	89
6.5R2	110	108	110
$\bar{X}$	96	95	99
RPD %	29	26	21
17R1	91	87	91
17R2	109	110	131
$\bar{X}$	100	99	111
RPD %	18	24	36
27R1	97	87*	113
27R2	105	100	108
$\bar{X}$	101	93	110
RPD %	8	14	4
Total $\bar{X}$	99	96	107
Total RSD %	11	12	15

[a] R1 = Replicate 1, R2 = Replicate 2.

[b] Spike level = 5.0 ng, final volume = 25 µL.

* $\bar{X}$ of two replicate analysis.

TABLE 6-20. RECOVERY OF ^{13}C-2,3,7,8-TCDF SPIKED ONTO CLEANUP COLUMN FROM PHILADELPHIA NORTHWEST NO. 1 INCINERATOR

Percent carbon[a]	Percent of spike recovered[b]		
	DCM	Benzene	Toluene
13R1	79	94	78
13R2	106	93	104
$\bar{X}$	92	94	91
RPD %	29	1	29
23R1	92	70	85
23R2	109	102	60
$\bar{X}$	101	86	73
RPD %	17	37	35
33R1	101	90*	73
33R2	98	99**	105
$\bar{X}$	99	94	89
RPD %	3	9	36
Total $\bar{X}$	97	91	84
Total RSD %	11	12	21

[a] R1 = Replicate 1, R2 = Replicate 2.

[b] Spike level = 1.25 ng, final volume = 25 μL.

* $\bar{X}$ of two replicate analysis.

** RIS added at 1/2 normal amount.

TABLE 6-21. RECOVERY OF ^{13}C-2,3,7,8-TCDD SPIKED ONTO CLEANUP COLUMN FROM PHILADELPHIA NORTHWEST NO. 1 INCINERATOR

Percent carbon[a]	Percent of spike recovered[b]		
	DCM	Benzene	Toluene
13R1	69	71	64
13R2	81	74	81
$\bar{X}$	75	73	72
RPD %	16	4	24
23R1	71	66	71
23R2	74	81	48
$\bar{X}$	73	74	60
RPD %	5	20	38
33R1	76	73*	69
33R2	74	79**	86
$\bar{X}$	75	75	77
RPD %	2	6	23
Total $\bar{X}$	74	74	70
Total RSD %	6	7	19

[a] R1 = Replicate 1, R2 = Replicate 2.

[b] Spike level = 1.25 ng, final volume = 25 µL.

* $\bar{X}$ of two replicate analysis.

** RIS added at 1/2 normal amount.

TABLE 6-22. RECOVERY OF ^{13}C-1,2,3,7,8-PeCDD SPIKED ONTO CLEANUP COLUMN FROM PHILADELPHIA NORTHWEST NO. 1 INCINERATOR

Percent carbon[a]	Percent of spike recovered[b]		
	DCM	Benzene	Toluene
13R1	71	93	90
13R2	97	101	106
$\bar{X}$	84	97	98
RPD %	31	8	16
23R1	92	84	83
23R2	96	97	65
$\bar{X}$	94	90	74
RPD %	4	14	24
33R1	91	89*	102
33R2	94	99**	99
$\bar{X}$	92	94	100
RPD %	3	11	3
Total $\bar{X}$	90	94	91
Total RSD %	11	7	17

[a] R1 = Replicate 1, R2 = Replicate 2.

[b] Spike level = 1.25 ng, final volume = 25 µL.

* $\bar{X}$ of two replicate analysis.

** RIS added at 1/2 normal amount.

TABLE 6-23. RECOVERY OF ^{13}C-1,2,3,6,7,8-HxCDD SPIKED ONTO CLEANUP COLUMN FROM PHILADELPHIA NORTHWEST NO. 1 INCINERATOR

	Percent of spike recovered[b]		
Percent carbon[a]	DCM	Benzene	Toluene
13R1	69	79	72
13R2	88	83	84
$\bar{X}$	78	81	78
RPD %	24	5	16
23R1	75	69	73
23R2	87	86	54
$\bar{X}$	81	77	64
RPD %	15	23	29
33R1	78	76*	74
33R2	83	83**	89
$\bar{X}$	81	80	82
RPD %	6	8	18
Total $\bar{X}$	80	80	75
Total RSD %	9	8	16

[a] R1 = Replicate 1, R2 = Replicate 2.

[b] Spike level = 5.0 ng, final volume = 25 µL.

* $\bar{X}$ of two replicate analysis.

** RIS added at 1/2 normal amount.

TABLE 6-24. RECOVERY OF ^{13}C-1,2,3,4,6,7,8-HpCDD SPIKED ONTO CLEANUP COLUMN FROM PHILADELPHIA NORTHWEST NO. 1 INCINERATOR

	Percent of spike recovered[b]		
Percent carbon[a]	DCM	Benzene	Toluene
13R1	85	92	87
13R2	99	100	98
$\overline{X}$	92	96	93
RPD %	16	8	12
23R1	93	82	90
23R2	99	101	69
$\overline{X}$	96	92	80
RPD %	6	21	27
33R1	92	96*	88
33R2	101	102**	104
$\overline{X}$	97	99	96
RPD %	9	6	17
Total $\overline{X}$	95	96	89
Total RSD %	7	8	13

[a] R1 = Replicate 1, R2 = Replicate 2.

[b] Spike level = 5.0 ng, final volume = 25 µL.

* $\overline{X}$ of two replicate analysis.

** RIS added at 1/2 normal amount.

The overall mean and percent RSD are also tabulated for each extraction solvent in the above tables. Unlike recovery of the ash spikes, recovery of the column spikes does not appear to be a function of ash type, suggesting that once extraction is completed, there is no significant additional matrix effect to attenuate recovery.

Replicate analysis was performed for two sample extracts. These data are presented in Tables 6-25 and 6-26. The relative percent differences for these analyses are within ±10% for 85% of the surrogate recovery data reported, suggesting a high degree of precision for the GC/MS analysis.

6.6.2 Results for the ^{13}C-Labeled Surrogates Spiked Onto the Native and Carbon-Augmented Ash Samples

Recovery data presented in a tabular format in the preceding section did not address the effect of unburned carbon on extractability. A cursory review of these data tables suggested that recovery may also be compared specifically. These data are also shown on Figures 6-1 through 6-6 using a bar graph presentation. Each of these figures are presented to show recovery as a function of extraction solvent. Figures 6-1, 6-2, and 6-3 show recovery data for surrogates spiked onto the native East Coast fly ash and the carbon-augmented East Coast fly ash. Figures 6-4, 6-5, and 6-6 present recovery data for the similarly treated Philadelphia Northwest No. 1 fly ash. Each bar shown on the figures represents the mean of a duplicate spike for the respective surrogate noted on the abscissa of the plots. Percent recovery is shown on the ordinate.

Observations

East Coast Fly Ash

Figure 6-1	Recovery of all surrogates was poor for the DCM extraction, ranging from 10% to 40%. There appears to be a trend indicating that the higher chlorinated congeners may be more difficult to extract from the native ash.

TABLE 6-25. RESULTS OF REPLICATE INJECTIONS OF ^{13}C-PCDD/PCDFs SPIKED ONTO EAST COAST COMPOSITE ASH AND CLEANUP COLUMN

Analyte	Surrogate recovery (%) Benzene 27% carbon (R1)	Benzene 27% carbon (R1-REP INJ)	$\bar{X}$	RPD %
^{13}C-1,2,3,4,7,8-HxCDF	69	65	67	6
^{13}C-OCDF	58*	65*	61	11
^{13}C-1,2,3,4-TCDD	81	66	74	20
^{13}C-1,2,3,7,8,9-HxCDD	67	66	67	1
^{13}C-OCDD	73	79	76	7
^{13}C-2,3,7,8-TCDF	80	77	78	4
^{13}C-2,3,7,8-TCDD	74	64	69	14
^{13}C-1,2,3,7,8-PeCDD	89	83	86	6
^{13}C-1,2,3,6,7,8-HxCDD	69	66	68	3
^{13}C-1,2,3,4,6,7,8-HpCDD	86	89	87	4

* Theoretical calculation.

TABLE 6-26. RESULTS OF REPLICATE INJECTIONS OF ^{13}C-PCDD/PCDFs SPIKED ONTO PHILADELPHIA NORTHWEST NO. 1 INCINERATOR ASH AND CLEANUP COLUMN

Analyte	Surrogate recovery (%) Benzene 33% carbon (R1)	Surrogate recovery (%) Benzene 33% carbon (R1-REP INJ)	$\bar{X}$	RPD %
^{13}C-1,2,3,4,7,8-HxCDF	75	78	76	4
^{13}C-OCDF	66*	70*	68	6
^{13}C-1,2,3,4-TCDD	74	77	76	5
^{13}C-1,2,3,7,8,9-HxCDD	76	76	76	1
^{13}C-OCDD	74	80	77	8
^{13}C-2,3,7,8-TCDF	88	92	90	5
^{13}C-2,3,7,8-TCDD	71	75	73	5
^{13}C-1,2,3,7,8-PeCDD	87	90	89	3
^{13}C-1,2,3,6,7,8-HxCDD	69	71	70	2
^{13}C-1,2,3,4,6,7,8-HpCDD	96	96	96	1

* Theoretical calculation.

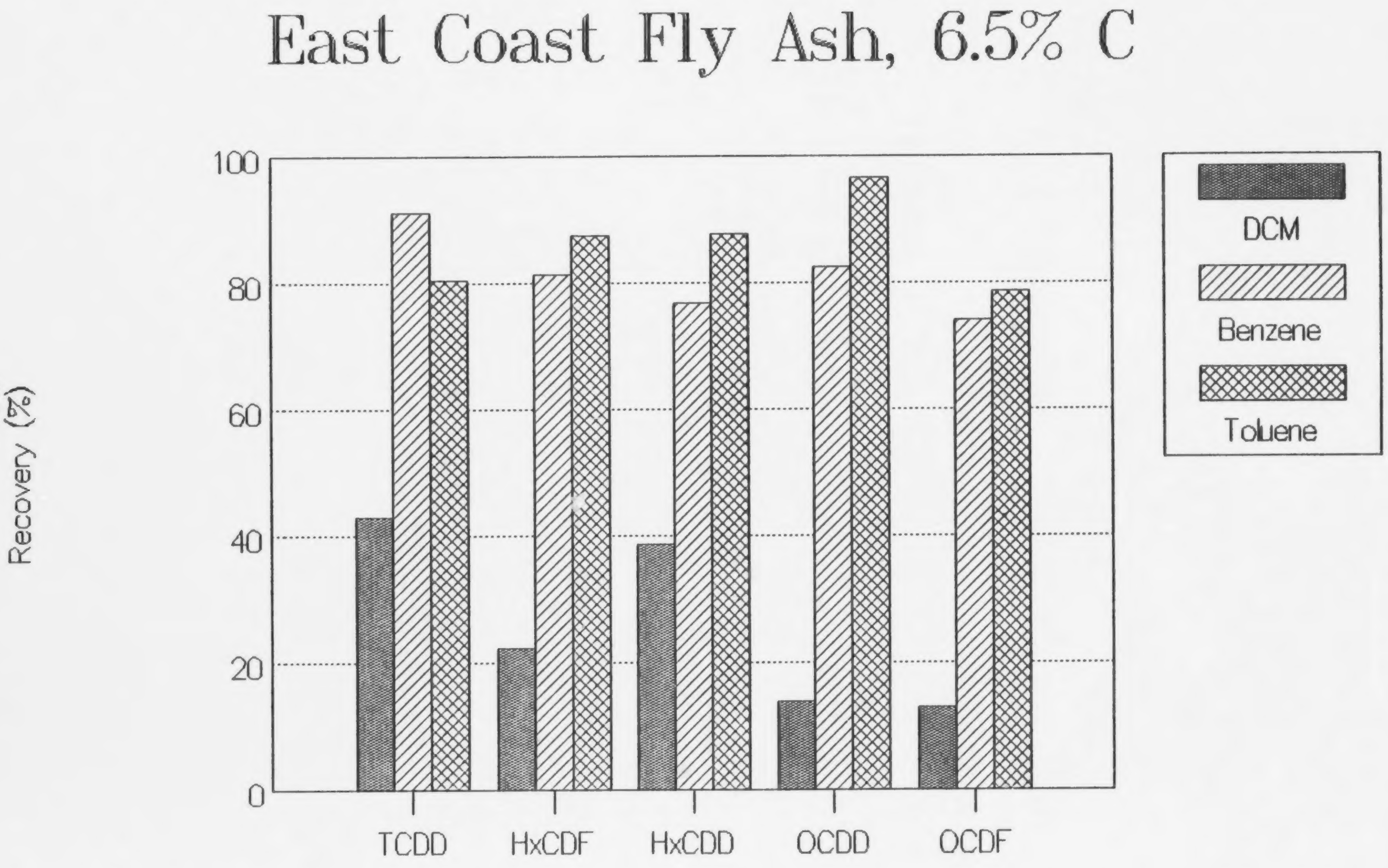

East Coast Fly Ash, 6.5% C
Recovery (%)
100
80
60
40
20
0
TCDD
HxCDF
HxCDD
OCDD
OCDF
DCM
Benzene
Toluene

Figure 6-1

Recovery in the benzene and toluene extracts was acceptable and ranged from 75% to 90% for all surrogates.

Figure 6-2 Recoveries of all congeners in the DCM extract appear to be enhanced by the addition of 10% unburned carbon to the native ash; these recoveries ranged from 50% to 80%. However, recovery in the DCM extract is lower. There appears to be no statistical difference in the recovery of TCDD and HxCDF for any of the extraction solvents. The higher chlorinated congeners appear to be less efficiently extracted in DCM. Recoveries in the benzene and toluene extracts range from 70% to 90% for all surrogates.

Figure 6-3 Again, recoveries of all congeners in the DCM extract appear to be enhanced by the addition of carbon to the native ash; these recoveries range from 65% to 75%. The trend for congeners in the DCM extract discussed above does not appear to be significant; i.e., all congeners regardless of the degree of chlorination were efficiently extracted. For each surrogate, toluene appears to be the most efficient extraction solvent, indicating recovery in the 85% to 100% range.

Recall that one objective of this study was to determine the effect of unburned carbon on extractability of surrogates using DCM, benzene, and toluene as the extraction solvent. These data suggest that the extraction efficiency in DCM may be enhanced by the addition of unburned carbon. However, the extraction efficiency for benzene and toluene do not appear to be enhanced; i.e., some degree of constancy is noted. Overall, toluene appears to be the most efficient extraction solvent.

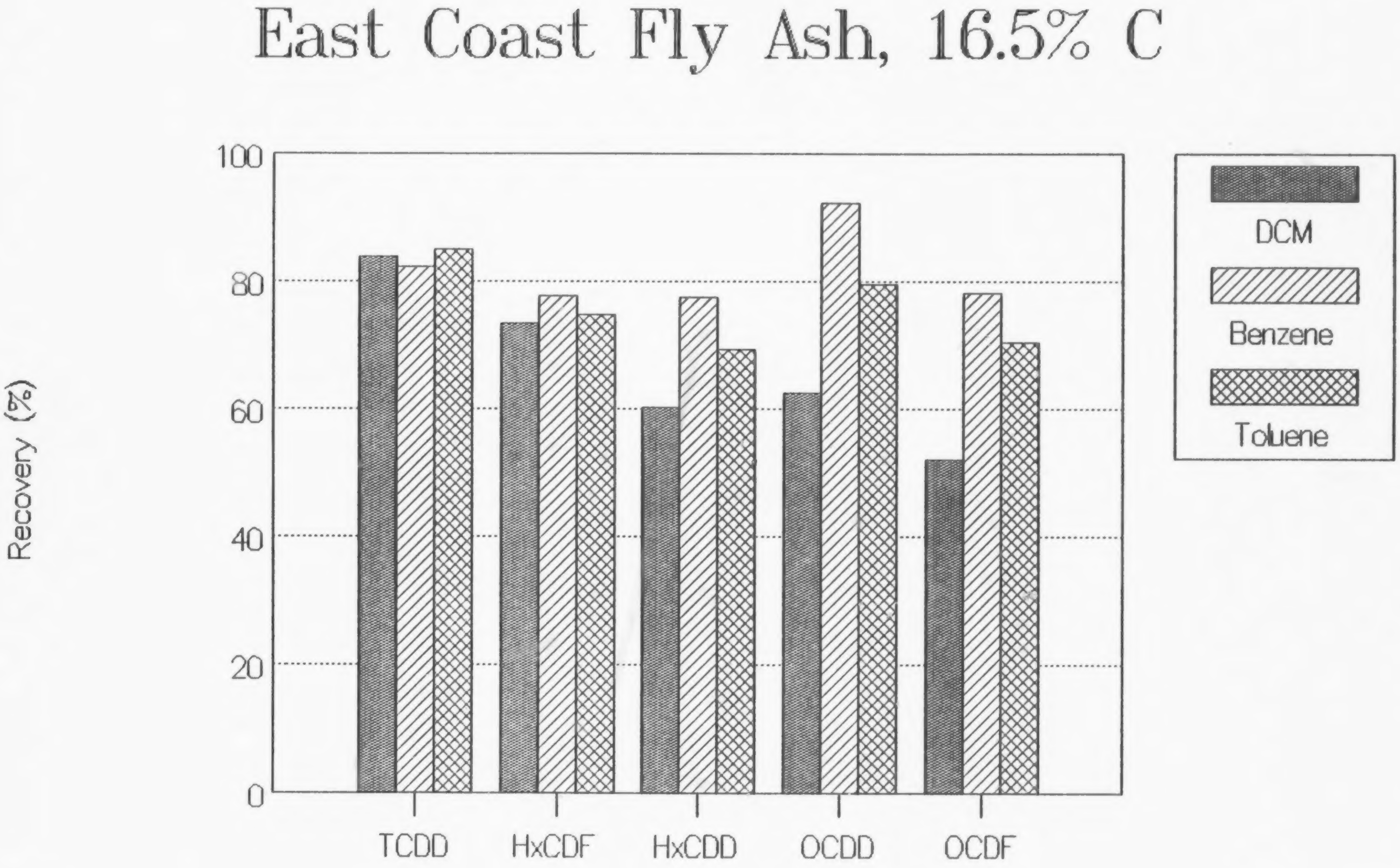

East Coast Fly Ash, 16.5% C

Figure 6-2

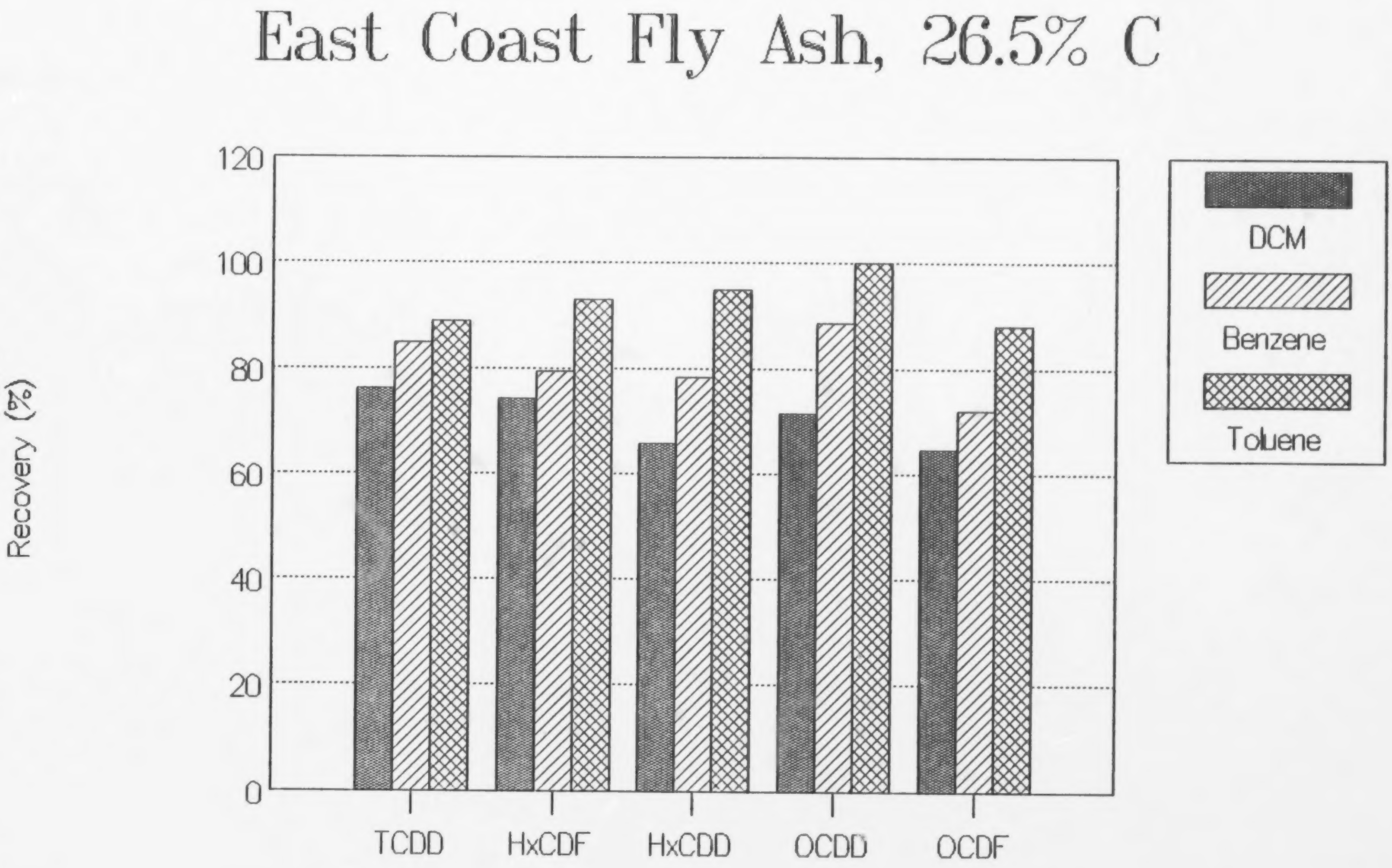

East Coast Fly Ash, 26.5% C

Figure 6-3

Observations

Philadelphia Northwest No. 1 Fly Ash

Figure 6-4 Recoveries of all surrogate from the native ash using DCM was poor, ranging from 7% to 18%. Recoveries of surrogates in the toluene extract appear to be somewhat consistent, ranging from 70% to 87%. Recovery in the benzene extract appears to be a function of the degree of chlorination. The tetrachlorinated surrogate was recovered at about 80%, yet the octachlorinated surrogate was only recovered at about 50%.

Figure 6-5 As noted for the East Coast fly ash, recoveries of surrogates in the DCM extract appear to be enhanced by the addition of 10% unburned carbon; these recoveries range from 47% to 78%. The higher chlorinated surrogates were less efficiently extracted. A similar downward trend was observed for surrogates in the benzene extract over a recovery range of 60% to 80%. Recovery in the toluene extract was less variable and suggested that OCDD/OCDF were extracted as the tetrachlorinated congener.

Figure 6-6 Unlike the recovery of surrogates in the DCM extract for the East Coast fly ash at the 26.5% carbon level, when recovery did not appear to be a function of the degree of chlorination, an addition of 20% carbon to the native Philadelphia fly ash resulted in lower recoveries for the higher chlorinated congeners. There does not appear to be a significant relationship of recovery vs. the degree of chlorination for surrogates in the benzene or toluene extracts (70% to 90%).

Similar results were obtained for the native and carbon-augmented Philadelphia fly ash as were discussed for the East Coast fly ash. Again toluene and benzene were the more efficient extraction solvents, and the addition of unburned carbon to the native fly ash resulted in an enhancement of recovery efficiency of spiked surrogates in the DCM extract.

Philadelphia NW #1 Fly Ash, 13% C

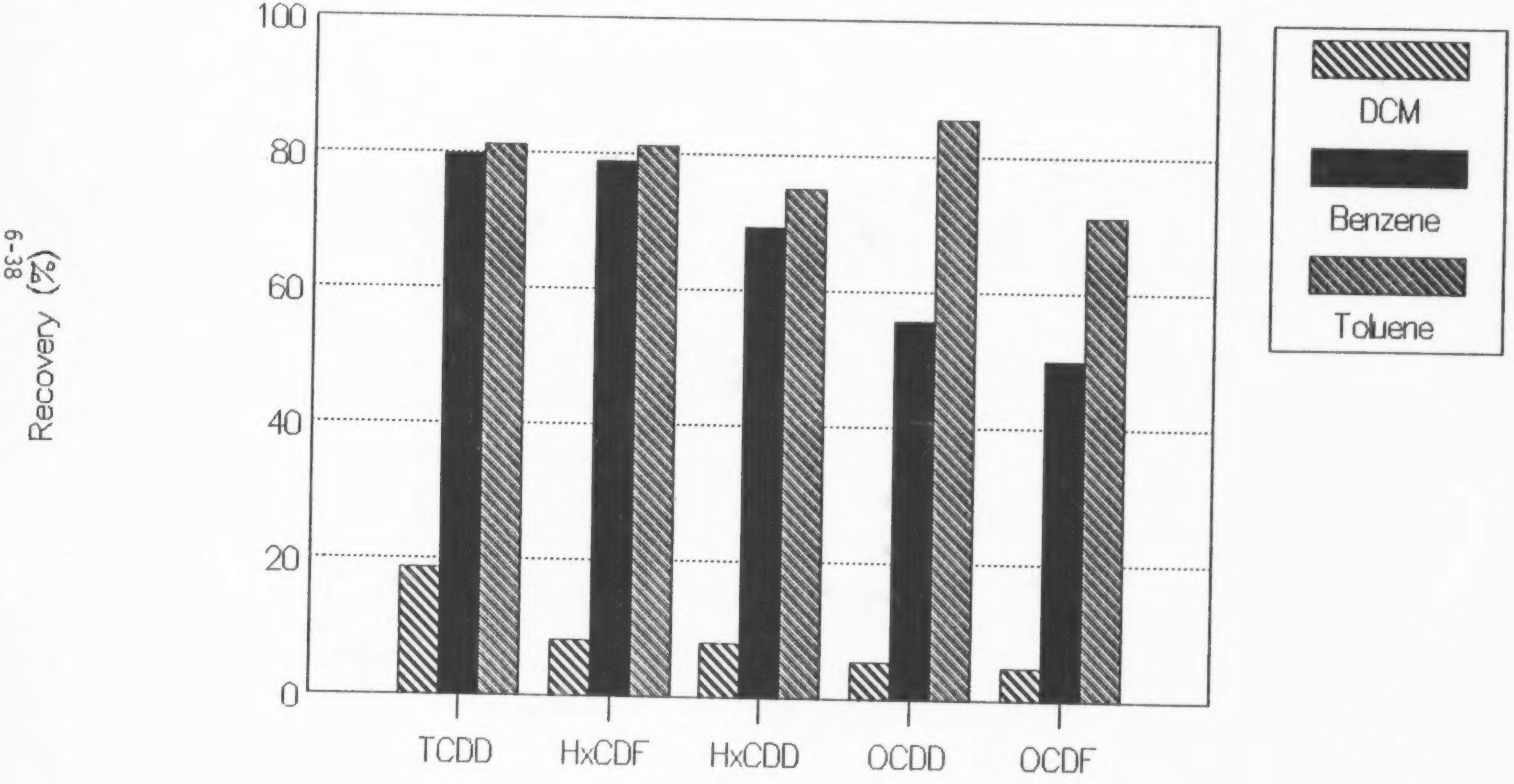


Figure 6-4

Philadelphia NW #1 Fly Ash, 23% C

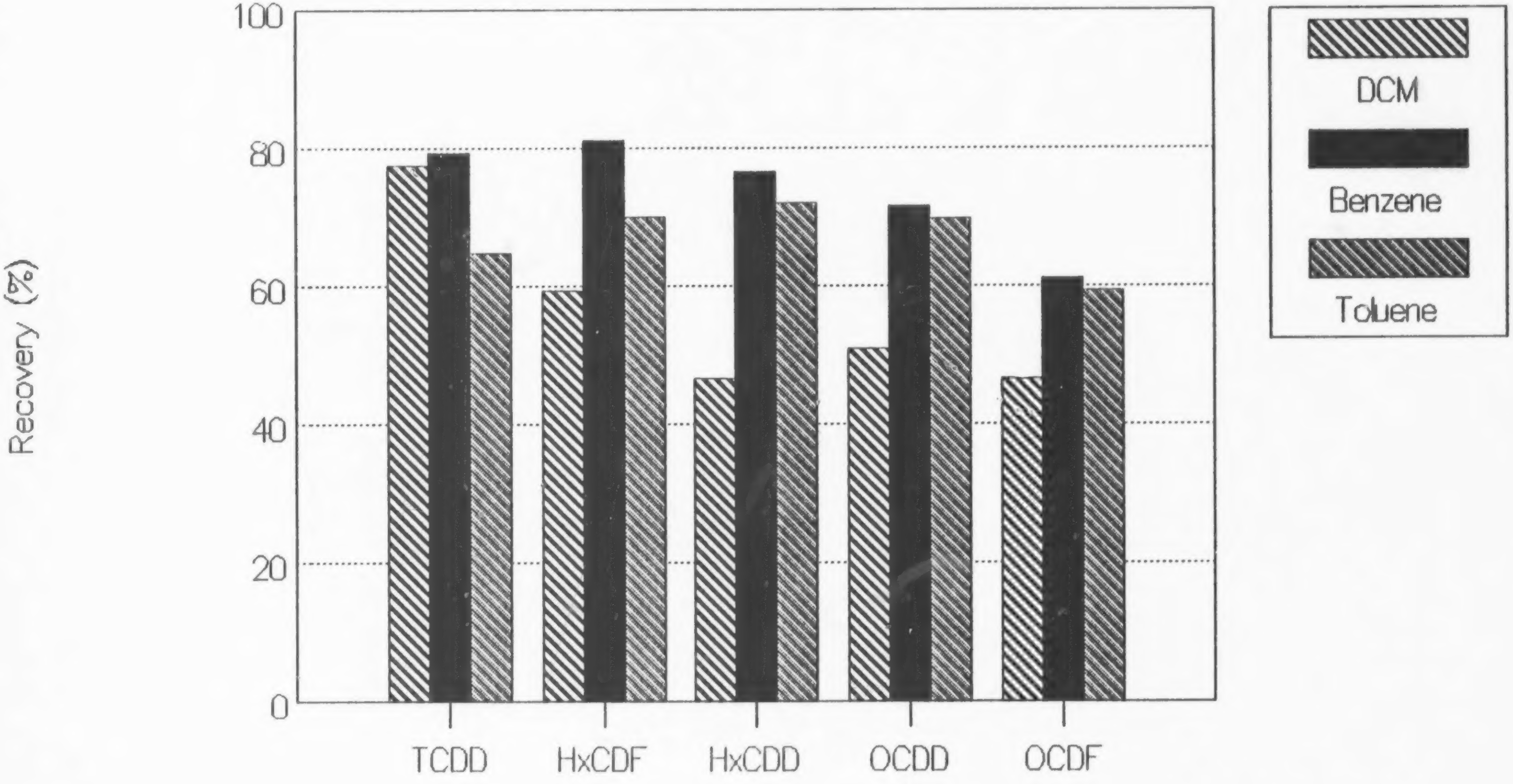
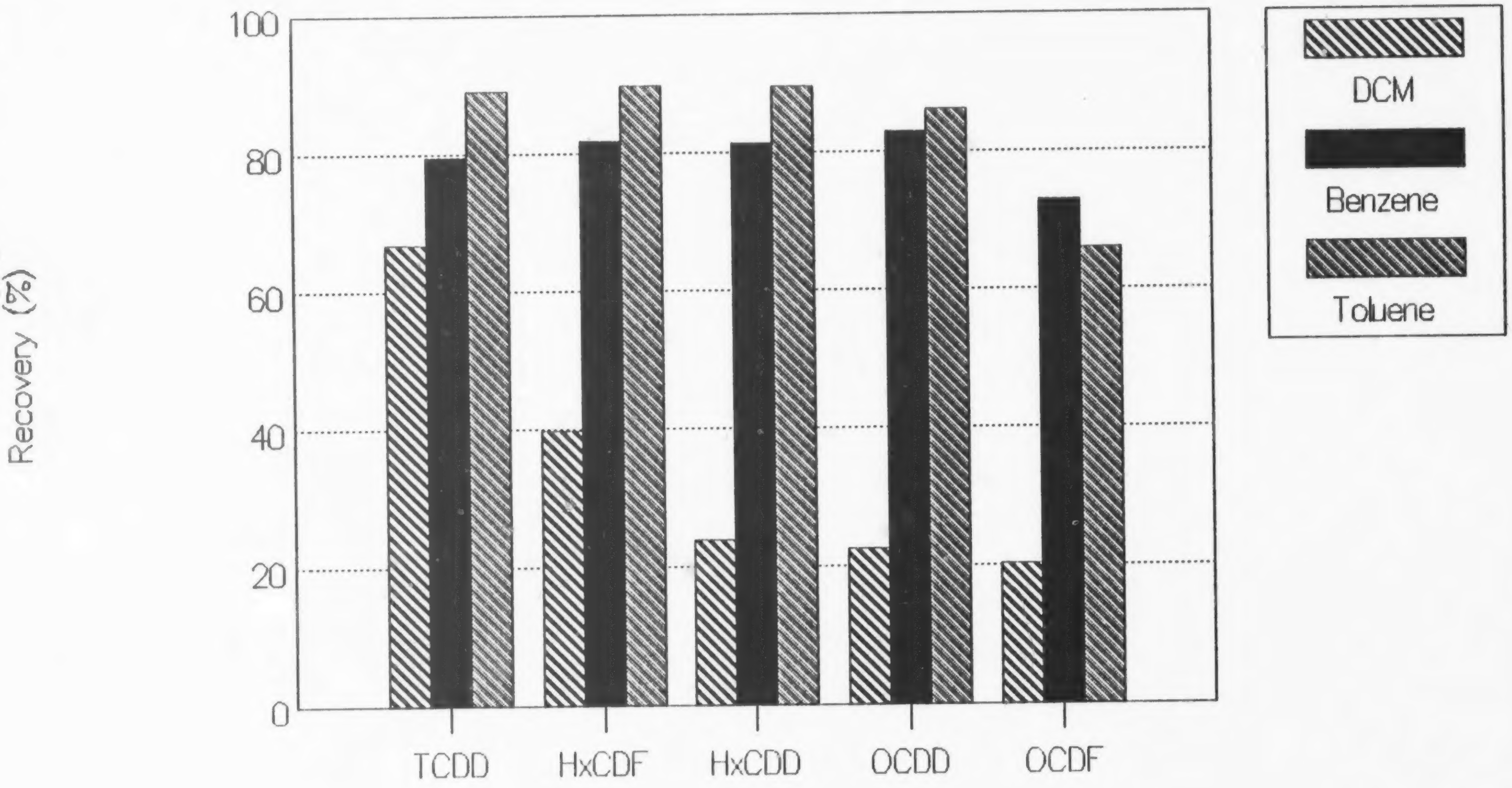


Figure 6-5



Philadelphia NW #1 Fly Ash, 33% C

Figure 6-6

Although an enhancement of recovery was observed for the DCM extracts, the magnitude of increased recovery was not as dramatic as was seen for the East Coast fly ash study.

These results were not anticipated, rather it was hypothesized that the addition of unburned carbon to native ashes would affect adsorption and make extractability more difficult.

It is apparent that overall recovery of surrogates in the toluene extracts was not influenced by the addition of unburned carbon to the native fly ash. Recall that the study (sample preparation and analysis) was conducted using a randomized Latin square design. In light of this type of randomization, the data suggest that a nonlinear functional relationship exists between recovery and carbon content in the toluene extracts. Recoveries of the ash surrogates appear to be within a range of 72% to 88% for the native ash (13% C), between 58% and 72% for the ash amended to 23% unburned carbon, and between 68% to 90% for the ash amended to 33% unburned carbon.

As noted previously, results from this investigation suggested that extractability may also be compound-specific. To discuss this observation, recoveries of each spiked PCDD and PCDF surrogate are shown in Figures 6-7 through 6-11 as a function of carbon content of the ash study.

Observations

1. The most striking observation for data presented in this manner is a comparison of extractability as a function of extraction solvent. Recovery of each spiked surrogate in DCM extract is significantly lower than recovery in toluene or benzene. This observation has been noted previously.

2. As a function of carbon content, the tetrachlorinated surrogate was more efficiently extracted in toluene or benzene, with a higher degree of precision than the hexa- or octachlorinated surrogates.

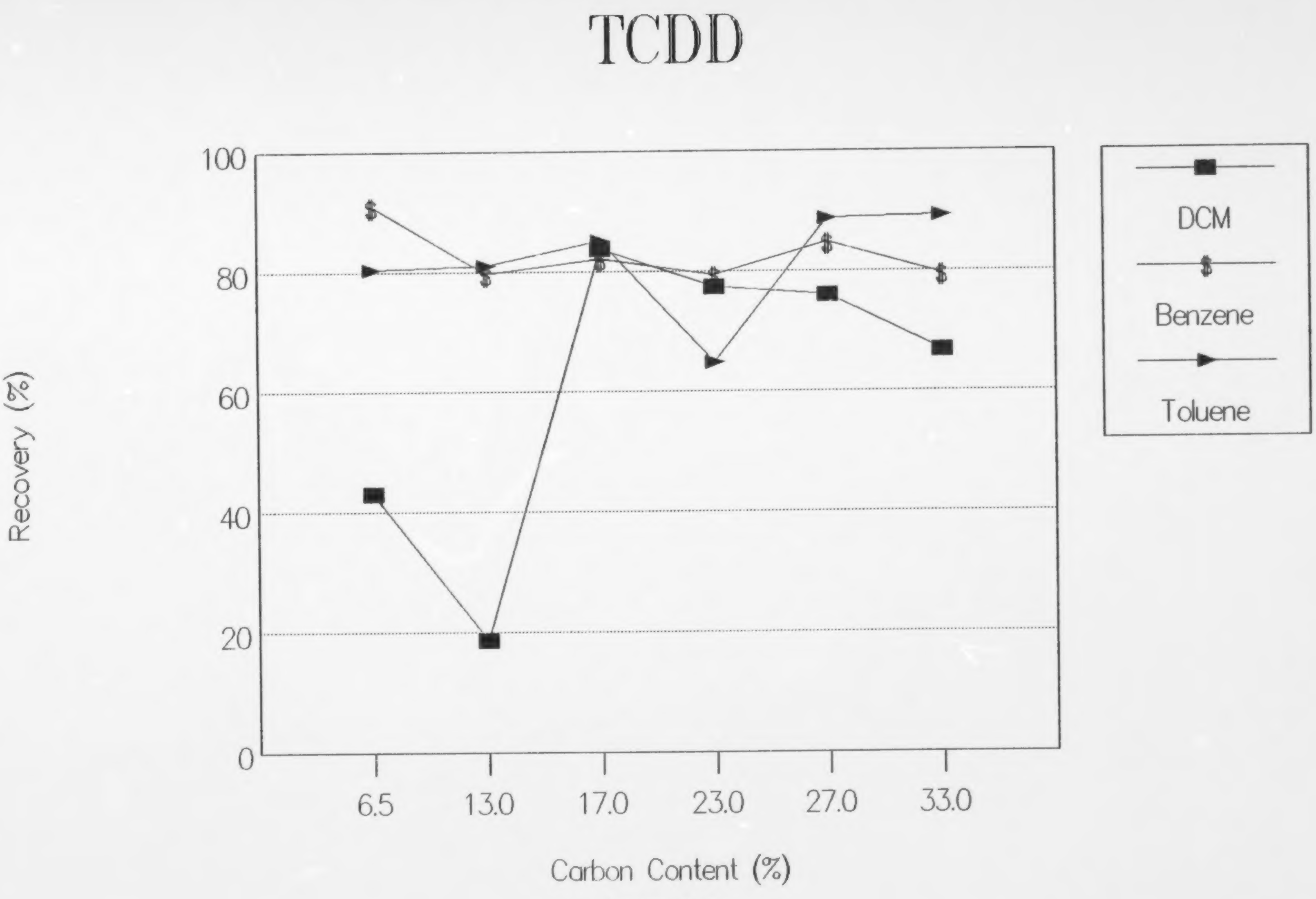

TCDD
Recovery (%)
0
20
40
60
80
100
6.5
13.0
17.0
23.0
27.0
33.0
Carbon Content (%)
DCM
Benzene
Toluene

Figure 6-7

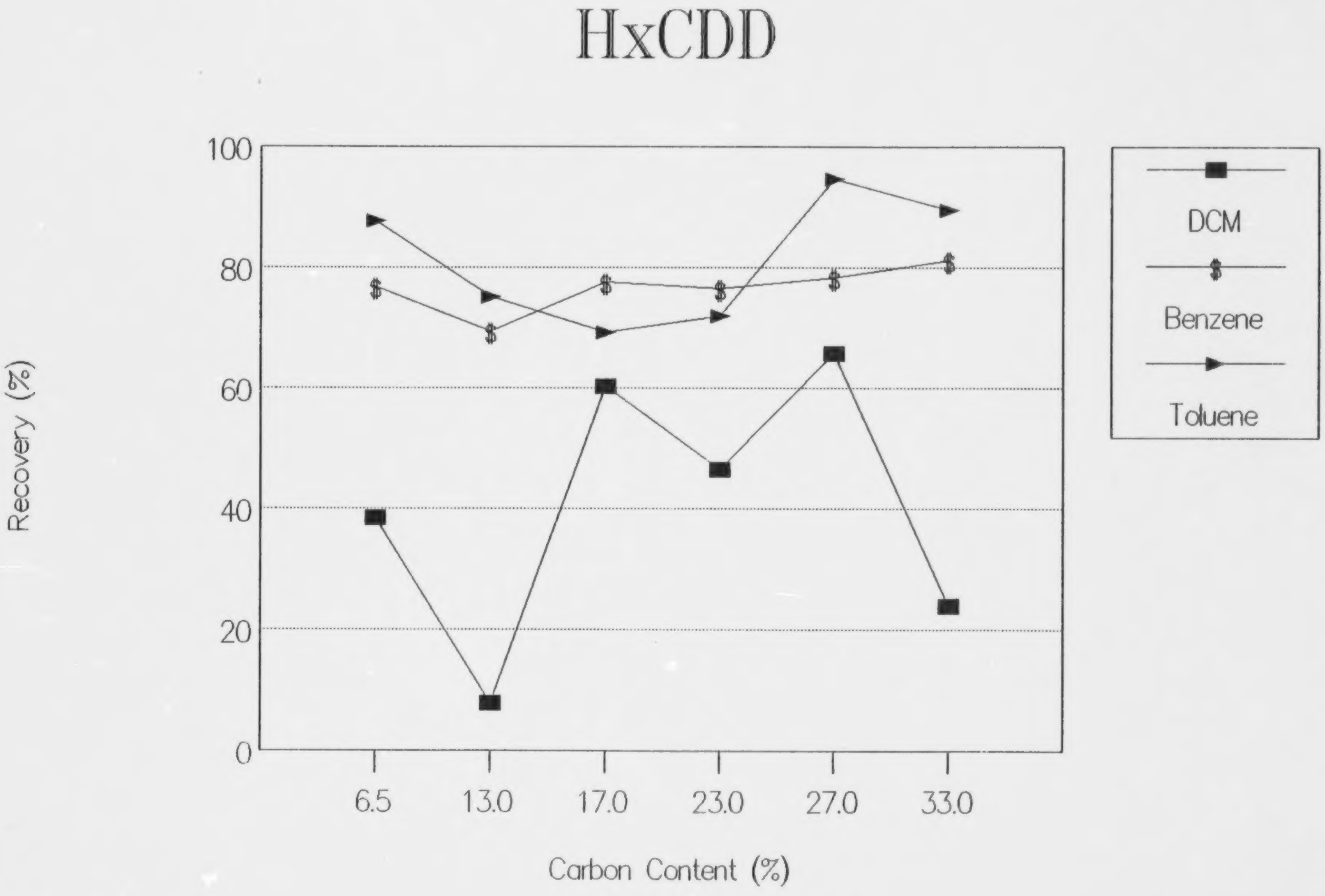

HxCDD
Recovery (%)
100
80
60
40
20
0
6.5
13.0
17.0
23.0
27.0
33.0
Carbon Content (%)
■ DCM
$ Benzene
► Toluene

Figure 6-8

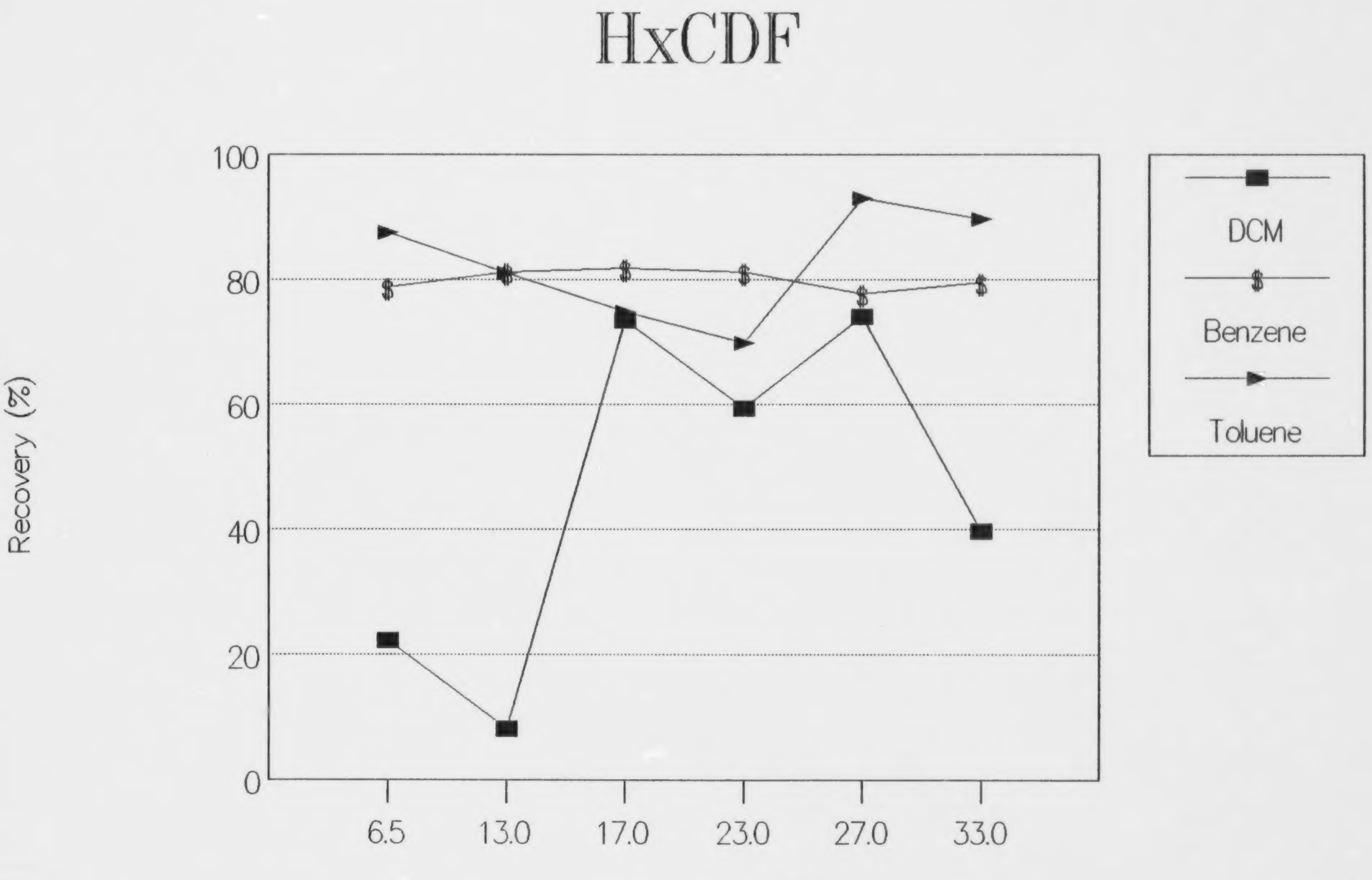

HxCDF
Recovery (%)
100
80
60
40
20
0
6.5
13.0
17.0
23.0
27.0
33.0
Carbon Content (%)
DCM
Benzene
Toluene

Figure 6-9

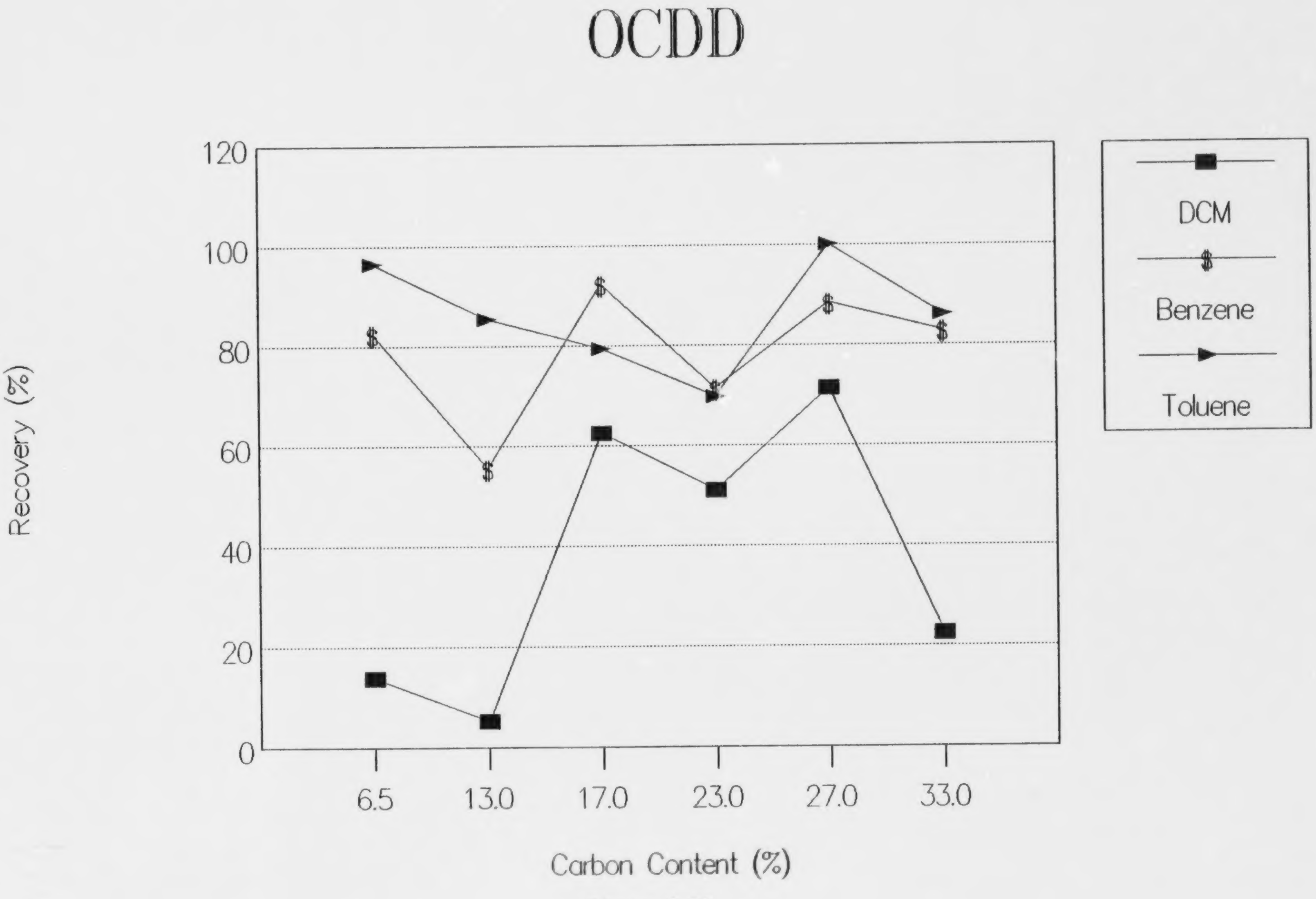

OCDD
Recovery (%)
120
100
80
60
40
20
0
6.5
13.0
17.0
23.0
27.0
33.0
Carbon Content (%)
■ DCM
$ Benzene
▶ Toluene

Figure 6-10

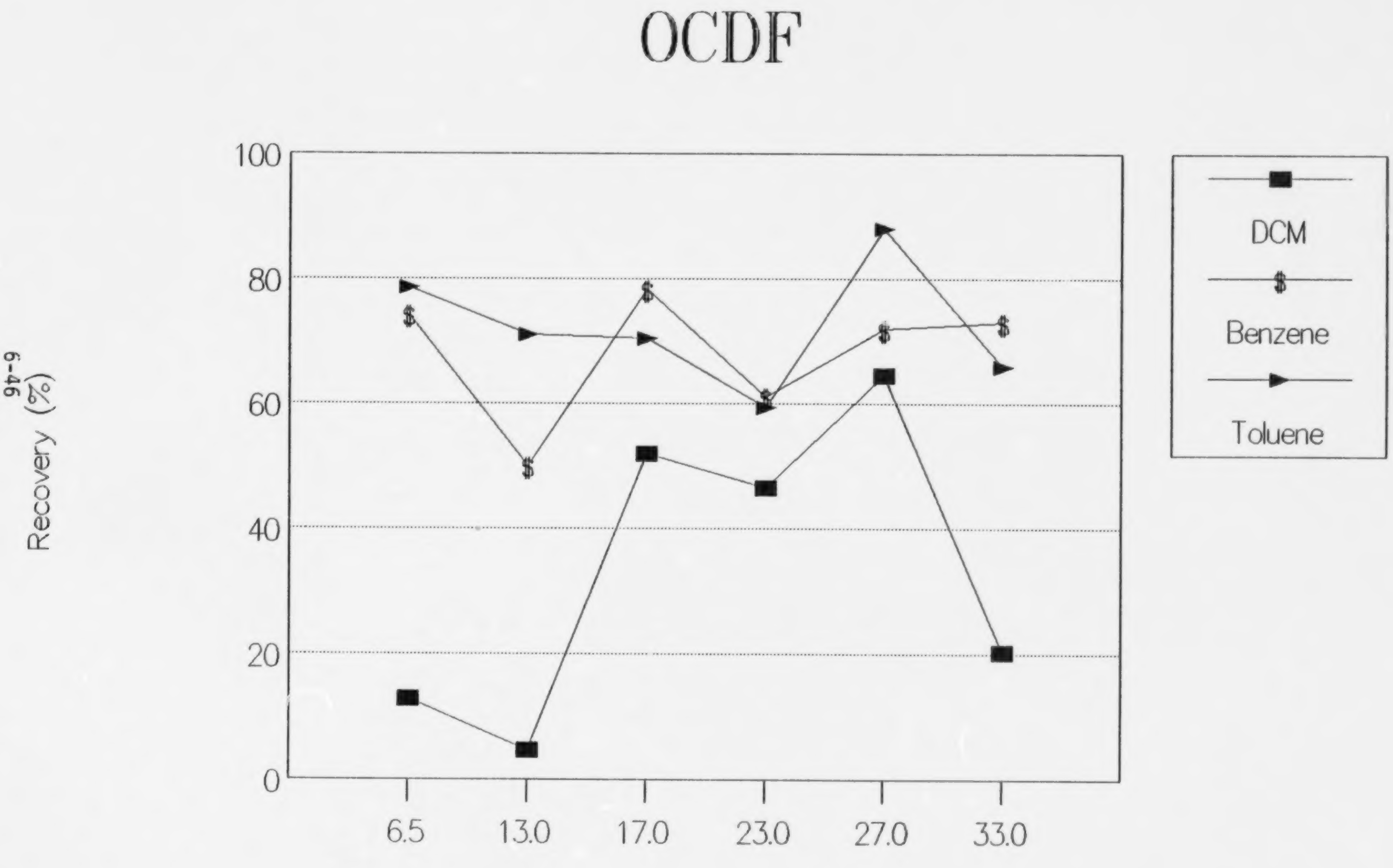

OCDF
Recovery (%)
100
80
60
40
20
0
6.5
13.0
17.0
23.0
27.0
33.0
Carbon Content (%)
DCM
Benzene
Toluene

Figure 6-11

Recoveries of the octachlorinated surrogates extracted in toluene and benzene were somewhat variable, ranging from 60% to 100%.

3. Recoveries of the hexachlorinated surrogates were more precise but indicated some dependence on carbon content between 13% and 25% carbon. A similar trend is also apparent for the octachlorinated surrogates in the toluene extracts. Recovery of surrogates in the benzene extracts does not exhibit this trend.

4. Finally, recovery of the OCDF surrogate was slightly less than the other surrogates (- 70%) yet somewhat variable.

Again, these data suggest that (1) overall extractability is not influenced by carbon content when toluene or benzene is used as the extraction solvent; (2) dichloromethane does not appear to be a suitable extraction solvent; (3) addition of unburned carbon to native ash may enhance recovery of spiked surrogates of DCM when used as the extraction solvent; (4) extractability of the tetra- and hexachlorinated surrogates appears to be more precise than that observed for the octachlorinated surrogates in the toluene and benzene extracts; and (5) extractability of the hexachlorinated dioxin may be slightly depressed for ashes containing 13% to 25% carbon.

While graphically presenting these data some caution has been exercised in drawing conclusions from the data. The study was conducted to infer extractability as a function of carbon content in the native ash. More explicitly stated, is extractability of ashes with a high native carbon content different than that for low carbon ashes? An attempt was made to augment native ashes with unburned carbon to allow the investigator to determine effects. However, the carbon used to augment the native ash was not obtained from a refuse incinerator, likely had a significantly different degree of activation than the incinerator ash, and probably differed in the physical makeup and number of active sites. A second and probably more important point should be discussed. Classically, surrogate spiking onto media to be extracted is usually done to draw inference regarding losses of target analytes during sample preparation, cleanup, and analysis and should not be construed to infer the degree of extractability of target analytes from the native matrix. This is especially important to understand as these results are reviewed.

Recall in the methodology discussed in Sections 6.2 and 6.5 that native ashes were augmented with carbon black, thoroughly mixed, and spiked with surrogates. After spiking, the sample was again thoroughly mixed for 1 h using a bar roller. After mixing, the "prepared" sample was allowed to air-dry prior to extraction. To test the null hypothesis (i.e., that unburned carbon has no effect on extractability of PCDDs and PCDFs), one must be assured that (1) the carbon used to augment native ash has the same degree of activity and number of active sites as the unburned carbon generated in the refuse incinerator and (2) spiked analytes adsorb onto the augmented carbon as would naturally occur in the incinerator stack gas. Neither of these assumptions are likely true for this study nor similar studies conducted to date. There are several techniques to physically adsorb hydrophobic analytes onto adsorption sites of solid surfaces. Generally, what is done is to attempt to adsorb analytes onto the matrix from organic or aqueous solutions. Concentrations of solutions may vary significantly. Adsorption onto active sites is driven by the solution phase concentration in either case. The thermodynamic potential for the adsorption process is represented by the partition coefficient calculated at equipotential, i.e., when the chemical potential of the sorbed phase is equivalent to the solution phase. At equilibrium the partition coefficient for sorbates in the organic solvent system is an order of magnitude less than the partition coefficient calculated from the aqueous system. What this means is that at equilibrium, more sorbate is adsorbed onto the sorbent for aqueous solutions of hydrophobic sorbates such as PCDDs and PCDFs than is adsorbed from organic solutions. Sorption processes from aqueous solutions are kinetic limited and often require long incubation periods (weeks to months) to reach equilibrium. Because of the kinetic limitation, it is impossible to adsorb a significant amount of sorbate onto the sorbent for short incubation periods. Furthermore, one must know the limitation rate to predict the amount of sorbate sorbed onto the sorbent for short incubation periods (hours). Because of these limitations, this form of spiking is seldom used.

Surrogate spiking is usually accomplished by coating (not adsorbing) the surrogate onto the matrix by preparing a slurry of the surrogate, solvent, and solid and allowing the solvent to evaporate. The important point is that neither of the techniques simulate the gas phase adsorption process that actually occurs in the incinerator stack gas. Hence an investigation of the type conducted for this project likely only addresses carbon as an interferent to extractability. In hindsight and given the observations presented from the study, an attempt to sorb the surrogates onto native ash using gas phase techniques would have been more appropriate.

6.7 STATISTICAL ANALYSIS

The following five analytes were used in the statistical analysis of the ash recovery study, ^{13}C-1,2,3,4,7,8-HxCDF, ^{13}C-OCDF, ^{13}C-1,2,3,4-TCDD, ^{13}C-1,2,3,7,8,9-HxCDD, and ^{13}C-OCDD. The dependent (y) variable was the surrogate recovery percentage for each analyte. The independent (x) variables used in the statistical analyses were the two ash samples, A and B; the percent carbon (low, medium, and high); and the three extraction solvents, DCM, benzene, and toluene.

To investigate the main effects and the interaction, the following model was fit by an analysis of variance.

% recovery = b0+b1*ash+b2*carbon+b3solvent+b4carbon*solvent

The results of the Systat run yielded the following Anova table for ^{13}C-1,2,3,4,7,8-HxCDF.

Source	SS	MS	DF	F	P	R value 0.789
Ash	206.5	206.5	1	0.63	0.434	
Carbon	2662.707	1331.354	2	4.061	0.028	
Solvent	9762.025	4881.013	2	14.89	0.000	
Carbon*Solvent	4529.054	1132.263	4	3.454	0.020	
error	9178.473	327.803	28			

By looking at the p values, one can determine which of the terms in the model were significant. (The p value is the lowest significance level at which the null hypothesis can be rejected, so a $p < 0.05$ indicates significance at the 5% level.) In this case the ash term was not significant. Thus recovery is not affected by the ash factor in this example. The other terms in the model, however, are significant at the 5% significance level, as the p values for the carbon, solvent, and carbon/solvent interaction terms were 0.028, 0.000, and 0.02, respectively. The significance of the carbon/solvent interaction term can be interpreted as one significantly influencing the other in the recovery of dioxins and furans.

Modifying the present model to include all combinations of the variables and their interaction terms (a saturated model) resulted in the only significant terms being carbon, solvent, and the carbon/solvent interaction term. In other words, the additional terms of ash/carbon, ash/solvent, and ash/carbon/solvent were not significant in the saturated model.

The next question addressed in the statistical analysis of the ash data was that of comparing solvents and carbons. The following p values are the results of testing for contrasts between solvents for ^{13}C-1,2,3,4,7,8-HxCDF.

Contrast	p Value
DCM--benzene	0.000
DCM--toluene	0.000
Benzene--toluene	0.173

Thus the solvent that appears to be significantly different than the other two is DCM.

Similarly, the same type of contrast was tested with the different carbon levels for ^{13}C-1,2,3,4,7,8-HxCDF.

Contrast	p Value
Low--medium	0.038
Low--high	0.035
Medium--high	0.870

It therefore appears that the low level carbon is significantly different than the other two levels.

To contrast solvents within the low level, the difference between cell means was computed and tested for significance for the same congener.

Contrast	p Value
M (low carbon, DCM)--M (low carbon, benzene)	0.319
M (low carbon, DCM)--M (low carbon, toluene)	0.001
M (low carbon, benzene)--M (low carbon, toluene)	0.584

This indicates that within the low level carbon experiments, the only significant difference between the solvents can be found between DCM and toluene.

The results of these analyses for all spiked surrogates are shown in Tables 6-27 and 6-28. The values presented in each table are mean percent recovery values for all solvents and ash type for the carbon effect and for all carbon levels and ash type for the solvent effect. Upon review of data presented in Table 6-27, only two of the five spiked surrogates were significantly different ($\alpha = 0.10$) for the ash factor, the ^{13}C-OCDF and ^{13}C-OCDD. Three of the surrogates were significantly different at the 10% level for the effect of carbon level. Several of the mean surrogate values were significantly different at the 10% level for solvent effect as shown in Table 6-28.

The following tabulation shows each carbon/solvent mean recovery that was typical for all spiked surrogates. The actual values presented are ^{13}C-1,2,3,4,7,8-HxCDF means.

TABLE 6-27. STATISTICAL ANALYSIS FOR CARBON EFFECT

Analyte	Carbon level (% recovery)		
	Low	Medium	High
^{13}C-1,2,3,4,7,8-HxCDF	57.79	72.75	76.08*
^{13}C-OCDF**	48.03	61.27	63.37
^{13}C-1,2,3,4-TCDD	63.90	78.76	80.28*
^{13}C-1,2,3,7,8,9-HxCDD	58.16	67.03	72.01
^{13}C-OCDD**	56.13	71.10	74.47*

* Denotes significant difference at 10% level.

** Denotes significant ash factor effect at 10% level.

TABLE 6-28. STATISTICAL ANALYSIS FOR SOLVENT EFFECT

Analyte	Extraction solvent (% recovery)		
	DCM	Benzene	Toluene
^{13}C-1,2,3,4,7,8-HxCDF*	44.26**	74.08	82.68
^{13}C-OCDF	33.63	61.45	72.22
^{13}C-1,2,3,4-TCDD*	58.26**	79.38	81.54
^{13}C-1,2,3,7,8,9-HxCDD	42.40**	68.59	81.38
^{13}C-OCDD*	38.47**	70.95**	86.28**

* Denotes significant carbon/solvent interaction at 10% level.

** Denotes significant difference at 10% level.

	Low C	Medium C	High C
DCM	9.5	66.5	52.0
Benzene	67.5	79.5	74.6
Toluene	84.3	72.4	91.4

From this presentation it is clear that the poor recovery using DCM in the low carbon experiments is highly significant and has influenced the interpretation of all of the above contrasts.

SECTION 7.0

PHASE 4--INVESTIGATION OF SAMPLE RECOVERY ENHANCEMENT PROCEDURES

7.1 BACKGROUND

Phases 2 and 3 of this study were designed to (a) determine method precision and accuracy and (b) to investigate the influence of unburned carbon and extraction solvent on the recovery of PCDDs and PCDFs from municipal waste combustor (MWC) ashes. Recoveries of field spikes from Phase 2 were low, and most of the field spikes were impinged on the filter component of the MM5 sampling train. Since DCM was used as the extraction solvent, poor recovery could be attributable to the failure to quantitatively extract the analytes from ash. In addition, it was observed in the lab studies that spiked analytes are typically impinged onto the back-half glassware in the sampling train. Since spiked analytes were not found in analysis of the extracts from the back-half rinses, it could also be postulated that the glassware rinsing procedures did not efficiently remove PCDDs and PCDFs from the glassware. Recovery of laboratory spikes from the Phase 3 study indicated that toluene or benzene more efficiently extracted PCDDs and PCDFs from MWC ashes.

Based on the above observations from the Phase 2 and 3 studies, a technique to enhance sample recovery from back-half glassware surfaces was proposed and investigated. Results of this study are presented in this section.

7.2 APPROACH

The experimental approach was to measure the recovery of specific PCDD and PCDF congeners spiked into a MM5 train while sampling a combustion gas. A series of laboratory studies were conducted to evaluate alternative impingement and recovery techniques to quantitatively recover PCDDs and PCDFs dynamically spiked into a MM5 sampling train. The test scenarios were:

Test 1	Evaluate impingement and recovery of labeled PCDD and PCDF congeners from a MM5 sampling train partially coated with Apiezon-L while sampling laboratory air. The back half of the sampling train was coated to test the hypothesis that recovery of PCDDs and PCDFs could be enhanced by coating glassware with a toluene miscible grease. Four MM5 sampling trains were used in this phase of the study. Labeled PCDD and PCDF congeners were dynamically spiked into the sampling trains at two levels (25 and 500 ng). Each level was replicated once. The back-half glassware for two of the four trains were coated with Apiezon-L. Each train was recovered by an acetone followed by a toluene rinse.
Tests 2 and 3	Test conditions for the latter phases of the investigation were identical to Test 1 except that the combustion gas was generated from a fuel-rich kerosene burner.

7.3 EXPERIMENTAL DESIGN

A total of 12 laboratory test runs were conducted (three test days with four trains operated each day) as shown in Table 7-1. The selected PCDD and PCDF congeners were spiked at two levels (25 and 500 ng). The MM5 train back-half glassware for each day for two test runs (one for each spiking level) was coated with Apiezon-L. Laboratory air was used as the flue gas matrix for Runs 12 and 13 and exhaust gas from a kerosene combustor served as the "flue gas" for the last 2 days of replicate runs. Four ^{13}C-PCDDs/PCDFs listed in Table 7-2 were continuously injected into the MM5 sampling train during each test run throughout the test.

TABLE 7-1. VALIDATION ON EMISSION TEST METHOD FOR DIOXINS

Stack location	Spiking level[a] Run No. 12[b]	13[b]	14[c]	15[c]	16[c]	17[c]
Lab A	UL	UH	UH	UL	UL	UH
Lab B	CL	CH	CH	CL	CL	CH

[a] Dynamic spiking levels: L = low = 5 ng; H = high = 500 ng; U = uncoated train; C = Apiezon-L coated train.

[b] Flue gas = laboratory air.

[c] Flue gas = combustion gas from a fuel-rich kerosene burner.

TABLE 7-2. SPIKING COMPOUNDS

Dynamic spiked analytes	Method internal[a] standards	Recovery internal[b] standards
^{13}C-1,2,3,4-TCDD	^{13}C-2,3,7,8-TCDD	^{13}C-1,2,3,6,7,8-HxCDD
^{13}C-1,2,3,7,8,9-HxCDD	^{13}C-2,3,7,8-TCDF	
^{13}C-1,2,3,4,7,8-HxCDF	^{13}C-1,2,3,7,8-PeCDD	
^{13}C-OCDF	^{13}C-1,2,3,4,6,7,8-HpCDD	

[a] Internal standards added before extraction.

[b] Internal standards added just prior to analysis.

7.4 METHODS

7.4.1 Sampling Methods

The MM5 sampling system utilized for this study was described in Section 5.0.

7.4.2 Analysis Methods

The back-half glassware and XAD-2 resin were recovered from each sampling train, extracted, and analyzed according to the methods included in Appendix B.

7.5 RESULTS AND DISCUSSION

Previous field and preliminary laboratory tests suggested that ^{13}C-labeled surrogates spiked dynamically into the MM5 train were impinged on the back-half glassware and may be susceptible to poor recovery. To potentially enhance recovery of surrogates from the glassware surface, the back-half glassware for several of the runs was coated with Apiezon-L. The preliminary laboratory tests also indicated that Apiezon-L could be efficiently removed from the surface of glassware by an acetone rinse followed by a toluene rinse.

Data obtained from this investigation are summarized in Tables 7-3 through 7-5. The recovery of ^{13}C-labeled surrogates from coated and uncoated back-half glassware are shown in Table 7-3 for Runs 12 and 13. The flue gas sampled for these test runs was laboratory air. Analysis of sample extracts from the back-half glassware for two spiking levels are shown in the table. Recovery of the dynamically spiked surrogates from the coated MM5 train component were far superior than from the uncoated component at each spiking level. With the exception of the ^{13}C-OCDF surrogate in the 25-ng spike, all surrogates were recovered from the coated MM5 train within a range of 67% to 133%. In contrast, recovery of the spiked surrogates from the uncoated train were within a range of 8% to 35%. Since recovery from the uncoated train was low, the XAD-2 resin extract was analyzed for three of the four spiked surrogates to determine if quantitative recovery from the uncoated train was obtained. Overall recovery was not quantitative ranging from 30% to 50% for the 25-ng spike and 36% to 57% for the 500-ng spike.

Similar results were obtained for the laboratory tests conducted using flue gas generated from a fuel-rich kerosene combustor. These data are shown in Tables 7-4 and 7-5 for replicate tests.

TABLE 7-3. RECOVERY OF ^{13}C-LABELED POLYCHLORINATED DIBENZO-*p*-DIOXINS AND DIBENZOFURANS DYNAMICALLY SPIKED INTO THE MM5 TRAIN FOR RUNS 12 and 13[a]

Analyte	Percent of dynamic spike recovered 25-ng Spike Back half	 XAD	 500-ng Spike Back half	 XAD
Coated train[b]				
^{13}C-1,2,3,4,7,8-HxCDF	129	NA	133	NA
^{13}C-OCDF	37.2	NA	90.6	NA
^{13}C-1,2,3,4-TCDD	68.2	NA	66.8	NA
^{13}C-1,2,3,7,8,9-HxCDD	82.6	NA	89.5	NA
Uncoated train				
^{13}C-1,2,3,4,7,8-HxCDF	18.9	30.3	35.3	21.2
^{13}C-OCDF	16.4	15.5	26.5	12.3
^{13}C-1,2,3,4-TCDD	8.1	NA	15.6	NA
^{13}C-1,2,3,7,8,9-HxCDD	12.1	20.4	21.6	14.5

[a] Flue gas from lab air.

[b] Back-half glassware was coated with Apiezon-L.

NA = not analyzed.

TABLE 7-4. RECOVERY OF ^{13}C-LABELED POLYCHLORINATED DIBENZO-*p*-DIOXINS AND DIBENZOFURANS DYNAMICALLY SPIKED INTO THE MM5 TRAIN FOR THE RUNS 14 AND 15[a]

	Percent of dynamic spike recovered			
	25-ng Spike		500-ng Spike	
Analyte	Back half	XAD	Back half	XAD
Coated train[b]				
^{13}C-1,2,3,4,7,8-HxCDF	113	2.8	212	1.1
^{13}C-OCDF	21.7	0.9	58.6	0.9
^{13}C-1,2,3,4-TCDD	86.8	NA	118	NA
^{13}C-1,2,3,7,8,9-HxCDD	74.2	2.8	156	1.2
Uncoated train				
^{13}C-1,2,3,4,7,8-HxCDF	14.0	57.7	NA	37.4
^{13}C-OCDF	6.1	31.9	NA	19.8
^{13}C-1,2,3,4-TCDD	7.3	NA	NA	NA
^{13}C-1,2,3,7,8,9-HxCDD	10.0	49.3	NA	29.4

[a] Flue gas from kerosene combustor.

[b] Back-half glassware was coated with Apiezon-L.

NA = not analyzed.

TABLE 7-5. RECOVERY OF ^{13}C-LABELED POLYCHLORINATED DIBENZO-p-DIOXINS AND DIBENZOFURANS DYNAMICALLY SPIKED INTO THE MM5 TRAIN FOR RUNS 16 AND 17[a]

	Percent of dynamic spike recovered			
	25-ng Spike		500-ng Spike	
Analyte	Back half	XAD	Back half	XAD
Coated train[b]				
^{13}C-1,2,3,4,7,8-HxCDF	86.1	NA	61.8	NA
^{13}C-OCDF	37.2	NA	47.2	NA
^{13}C-1,2,3,4-TCDD	NA	NA	NA	NA
^{13}C-1,2,3,7,8,9-HxCDD	74.2	NA	61.5	NA
Uncoated train				
^{13}C-1,2,3,4,7,8-HxCDF	20.6	34.3	22.5	25.9
^{13}C-OCDF	21.3	22.8	13.6	13.6
^{13}C-1,2,3,4-TCDD	NA	NA	NA	NA
^{13}C-1,2,3,7,8,9-HxCDD	20.7	30.2	17.0	20.3

[a] Flue gas from kerosene combustor.

[b] Back-half glassware was coated with Apiezon-L.

NA = not analyzed.

Again, recovery of ^{13}C-OCDF from the coated back-half glassware was low relative to the remaining three labeled PCDDs/PCDFs. Recovery of the ^{13}C-HxCDF for the 25-ng spike averaged 100%, 87% for the ^{13}C-TCDD, and 74% for the ^{13}C-HxCDD. Recovery of ^{13}C-HxCDF, ^{13}C-OCDF, ^{13}C-TCDD, and ^{13}C-HxCDD obtained from the uncoated train spiked at the 25-ng level averaged 17%, 14%, 7%, and 16%, respectively. The average surrogate amount found in the XAD-2 extract for the 25-ng spike was 46%, 27%, and 40% for the ^{13}C-HxCDF, ^{13}C-OCDF, and ^{13}C-HxCDD, respectively. The labeled TCDD was not measured in the XAD-2 extract.

Results from the back-half glassware and XAD-2 extracts for the 500-ng spike are more difficult to analyze. Recovery of the four labeled surrogates differed significantly between the replicate runs when the back-half glassware was coated. This variability may be a result of failure to remove all of the Apiezon-L from the sample extract. The cleanup scheme used to remove interfering organic compounds was designed to remove hydrocarbons and should have eliminated the grease from the extract. It is plausible that the more polar organic fraction of Apiezon-L may have not been removed. If so, one would expect the chromatography to be altered since Apiezon-L is often used as a liquid phase in gas-liquid chromatography. Certainly, the inability to eliminate Apiezon-L from the extract should be considered when selecting an appropriate coating material for back-half glassware.

Data obtained from the MM5 component extracts for the uncoated train are similar to results obtained for the 25-ng spike. One replicate back-half extract was lost during sample preparation and is noted as "not analyzed" in Table 7-4. The replicate analysis shown in Table 7-5 is almost identical to recovery values obtained for the 25-ng spike. Furthermore, analysis of the replicate XAD-2 extracts are identical to estimates obtained for the 25-ng spike, and do not suggest quantitative recovery from the uncoated MM5 train.

These data suggest that coating the back-half glassware may increase recovery of polychlorinated dibenzo-*p*-dioxins and dibenzofurans. It could also be argued that coating simply increases impingement efficiency on the back-half glassware. Although the argument may be conceptually valid, data collected thus far does not support this position. Since near quantitative recovery for the surrogate spike was obtained on the back half for the coated trains, one could argue that surrogates were not impinged on the front half of the trains (i.e., probe area or filter area). If the difference in recoverability for coated versus uncoated trains was a result of increased impingement efficiency on the back half, the deficient should be retained on the XAD-2 cartridge. Four XAD-2 cartridges were analyzed for Runs 14 and 15 and are also shown in Table 7-4. Two XAD-2 extracts were analyzed for Runs 16 and 17 for the uncoated train and are presented in Table 7-5. Results indicate that surrogates were impinged on the XAD cartridge and overall surrogate recovery was increased but not at quantitative levels and did not compare well with overall recovery of the coated trains.

The results of this investigation were used to design the next phase of the validation of dioxin and furan emission test methods.

SECTION 8.0

PHASE 5--DETERMINATION OF PRECISION AND ACCURACY USING MODIFIED RECOVERY PROCEDURES WITH MWC FLUE GAS BACKGROUND

8.1 OBJECTIVES AND APPROACH

The objective of this phase was to characterize the precision and the accuracy of the MM5 sampling system for PCDDs and PCDFs in stack gas samples using modified sample recovery procedures. A secondary objective was to determine if the operating temperature of the filter box affects the distribution and impingement of PCDDs and PCDFs within the MM5 sampling train while sampling incinerator flue gas laden with high levels of particulate matter.

The general experimental approach was to measure the recoveries of specific PCDD and PCDF congeners spiked onto MM5 trains during incineration stack gas sampling. Selected isotopically labeled congeners representing tetrachloro through octachloro PCDD and PCDF congeners were spiked onto the XAD-2 resin prior to each test (static spiking) and continuously throughout the duration of the test (dynamic spiking). This test differs from the earlier test in four basic areas:

1. The replicate runs were conducted at the inlet and outlet relative to the control device rather than the inlet only.

2. Each of the field analytes (^{13}C-PCDDs/PCDFs) was dynamically spiked into the MM5 train at two levels (25 and 500 ng) rather than three.

3. The filter box temperature was run at 250°F and 420°F for replicate sets of runs for each spiking level at the inlet and outlet locations rather than using the lower temperature only.

4. Each of the 18 sampling trains had back-half glassware that was precoated with Apiezon-L.

The incinerator selected for this study was the same unit described in Section 5.0. The sampling trains were not traversed during test runs but operated at two replicate points.

The specific isotopically labeled PCDD and PCDF congeners that were spiked onto the train are shown in Table 8-1. Table 8-1 also presents the congeners used as method and recovery internal standards.

TABLE 8-1. ISOTOPICALLY LABELED PCDD AND PCDF CONGENERS USED IN THE MM5 EVALUATION STUDY

Field spiked analytes	Method internal[a] standards	Recovery internal[b] standards
^{13}C-1,2,3,4-TCDD	^{13}C-2,3,7,8-TCDD	
	^{13}C-2,3,7,8-TCDF	
^{13}C-1,2,3,7,8-PeCDF[c]	^{13}C-1,2,3,7,8-PeCDD	
^{13}C-1,2,3,7,8,9-HxCDD		^{13}C-1,2,3,6,7,8-HxCDD
^{13}C-1,2,3,4,7,8-HxCDF	^{13}C-1,2,3,4,6,7,8-HpCDD	
^{13}C-OCDD		
^{13}C-OCDF		

[a] Internal standards added before extraction.

[b] Internal standards added just prior to analysis.

[c] Static spike.

8.2 EXPERIMENTAL DESIGN

A total of 16 test runs was conducted (four test days with four trains operated each day, two inlet and two outlet relative to the control device). The selected PCDD and PCDF congeners were spiked at two levels (25 and 500 ng). Each of the two sampling points was considered as a replicate set. That is, Ports 1 and 2 were replicates and Ports 3 and 4 were replicates. It was desirable that a given MM5 train be spiked with the low level spike before the high level spike to reduce the potential of carryover between test runs. The possibility existed that test days as well as locations within a stack cross-section area should be considered as a blocking factor.

The test matrix is shown in Table 8-2. Each of the individual sampling trains was uniquely identified so they could be tracked to ensure that trains were not selected for low level spikes following a test run at a high level spike. The matrix provided for replication of one spike level and one filter box temperature on each test day.

8.3 METHODS

8.3.1 Sampling Methods

The MM5 sampling system used for this study was essentially the same as described in the draft ASME protocol except for modifications described in Section 5.0. Other procedural modifications were as follows:

- Nickel nozzles were used on the probes.
- Borosilicate glass was used for each MM5 component.
- All back-half glassware was coated with a thin layer of Apiezon-L.
- All references to hexane rinses were changed to toluene rinses.
- No stack traversing was performed (single point isokinetic).

TABLE 8-2. TEST MATRIX FOR VALIDATION ON EMISSION TEST METHOD FOR POLYCHLORINATED DIBENZO-p-DIOXINS AND DIBENZOFURANS

Test day	Port	Location: Inlet spike/F.B. temp.[a]	Location: Outlet spike/F.B. temp.[a]	Blank train
1	1	25/250		
	2	25/250		
	3		25/250	
	4		25/250	
2	1	25/420		
	2	25/420		
	3		25/420	outlet
	4		25/420	
3	1	500/420		inlet
	2	500/420		
	3		500/250	
	4		500/250	
4	1	500/250		
	2	500/250		
	3		500/420	
	4		500/420	

[a] Spike designates dynamic spike level (ng) and F.B. designates filter box.

- Filter housings were operated at 420°F and 250°F as noted in the test matrix.
- Blank trains were run sampling ambient air for the 3-h tests.
- One blank train was recovered at each of the sampling locations (inlet and outlet).

8.3.2 Analysis Method

The analysis was performed in accordance with the draft ASME procedures, with the following minor modifications routinely used by MRI. The methods are described in detail in Appendix B.

8.4 RESULTS AND DISCUSSION

8.4.1 Recovery of Static Spike

Table 8-3 presents the percent recovery of the static spike added to the XAD-2 resin immediately prior to this test.

TABLE 8-3. PERCENT RECOVERY OF STATIC SPIKE[a] ON XAD-2 RESIN

Sampling location	Spike level (ng)	Filter box temp. (°F)	Percent recovery on XAD resin
Inlet	25	250	99.4
			107
		420	78.6
			81.5
	500	300	89.0
		320	77.7
		420	71.9
Outlet	25	250	101
			84.3
		420	97.5
			92.4
	500	250	86.6
			93.4
		420	44.3
			92.6

[a] ^{13}C-1,2,3,7,8-pentachlorodibenzofuran.

For the inlet sampling location, there was a decrease in recovery when the filter box was heated to 420°F as compared to 250°F (student's t-test parameters: t = 2.030, df = 5, α = 0.10). At the high spike level, problems with the control of the temperature of the filter box resulted in temperatures higher than originally planned for the low set point. At the outlet sampling location, recoveries were generally above 85% regardless of the filter box temperature, and there were no significant differences in static spike recovery between the low and high filter box temperatures (t = 0.956, df = 6, α = 0.01). One of the high spike, high temperature filter box recoveries (44%) was subjected to a Dixon outlier test. The result was nonrejection of the value on the basis of the Q-statistic (Q = 0.72, P ≥ 96%).

8.4.2 Recovery of Dynamic Spikes, Inlet

The results for the recovery of the dynamic spikes collected at the inlet are presented in Table 8-4. The recoveries at each one of the two locations and their sums are displayed together with the average recovery and relative percent difference (RPD) for the two replicate sampling points.

The average of the sum of the dynamic spike recoveries ranged from 49.5% to 70.6%. The 49.5% average recovery was from the high spike, high filter box temperature sampling train, in which one of the replicate trains was lost due to a leak. Relative standard deviations were from about 13% to 22%.

The relative percent difference (RPD) between each replicate sampling train provides an indication of sampling precision. An RPD value of 35% or less indicates reproducible sampling of the stack material. Overall, the majority of the replicate results had less than 35% RPD (39 of 60 replicate measurements). For the low temperature, low spike inlet samples, the OCDF had poor RPD for each portion of the sample train analyzed. At the high temperature, low spike samples, poor precision was accounted mostly by the back-half and XAD subsamples. This may reflect some difficulty in consistently mobilizing the compounds trapped in the cyclone/ filter by increasing the temperature of the filter box.

TABLE 8-4. PERCENT RECOVERY OF DYNAMIC SPIKES FROM THE INLET SAMPLING LOCATION MM5 SAMPLING TRAINS

Spike level (ng)	^{13}C-Labeled analyte	Stack location	Filter box temperature = 250°F					Filter box temperature = 420°F				
			Cyclone/ filter	Front half	Back half	XAD	Sum of recov.	Cyclone/ filter	Front half	Back half	XAD	Sum of recov.
25	HxCDF	1	40.3	18.7	1.74	3.40	64.1	29.6	2.84	15.8	6.24	54.5
		2	53.9	20.0	2.14	3.74	79.8	35.2	3.04	40.8	1.22	80.3
		Average	47.1	19.4	1.94	3.57	72.0	32.4	2.94	28.3	3.73	67.4
		RPD	28.9	6.72	20.6	9.52	NA	17.3	6.80	88.3	135	NA
	OCDF	1	28.5	16.4	0.487	1.15	46.5	46.0	4.04	8.65	5.33	64.0
		2	61.3	24.5	0.202	0.717	86.7	50.8	3.88	15.9	0.615	71.2
		Average	44.9	20.5	0.345	0.933	66.6	48.4	3.96	12.3	2.97	67.6
		RPD	73.1	39.6	82.7	46.4	NA	9.9	4.04	59.1	159	NA
	TCDD	1	35.3	17.3	4.66	8.02	65.3	20.9	2.29	21.3	7.28	51.8
		2	39.8	19.4	3.59	6.66	69.5	31.1	3.19	27.1	3.10	64.5
		Average	37.6	18.4	4.13	7.34	67.4	26.0	2.74	24.2	5.19	58.1
		RPD	12.0	11.4	25.9	18.5	NA	39.2	32.8	24.0	80.5	NA
	HxCDD	1	37.2	17.1	2.34	2.77	59.4	37.4	3.32	13.5	6.91	61.1
		2	47.8	18.2	2.19	2.61	70.8	35.3	3.35	24.2	2.71	65.6
		Average	42.5	17.7	2.26	2.69	65.1	36.4	3.34	18.9	4.81	63.3
		RPD	24.9	6.23	6.62	5.95	NA	5.78	0.90	56.8	87.3	NA
	OCDD	1	47.0	22.1	0.821	0.792	70.7	52.8	4.42	5.68	3.42	66.3
		2	65.2	27.0	0.331	0.852	93.4	57.1	4.31	11.7	0	73.1
		Average	56.1	24.6	0.576	0.822	82.0	55.0	4.37	8.69	1.71	69.7
		RPD	32.4	20.0	85.1	7.30	NA	7.83	2.52	69.3	200	NA
							$\bar{x}$ = 70.6					$\bar{x}$ = 65.2
							S = 13.5					S = 8.44
							RSD = 19.1%					RSD = 12.9%

(continued)

TABLE 8-4 (continued)

Spike level (ng)	^{13}C-Labeled analyte	Stack location	Filter box temperature = 250°F					Filter box temperature = 420°F				
			Cyclone/ filter	Front half	Back half	XAD	Sum of recov.	Cyclone/ filter	Front half	Back half	XAD	Sum of recov.
500	HxCDF	1	68.9	5.24	6.19	1.72	82.1	NA	NA	NA	NA	NA
		2	37.1	4.65	9.77	1.43	53.0	25.4	2.61	11.9	2.73	42.6
		Average	53.0	4.95	7.98	1.58	67.5	25.4	2.61	11.9	2.73	42.6
		RPD	60.0	11.9	44.9	18.4	NA	NA	NA	NA	NA	NA
	OCDF	1	59.4	11.2	2.82	0.652	74.1	NA	NA	NA	NA	NA
		2	52.3	8.35	3.62	0.463	64.7	45.8	4.79	6.35	1.79	58.7
		Average	55.9	9.77	3.22	0.557	69.4	45.8	4.79	6.35	1.79	58.7
		RPD	12.7	29.2	24.8	33.9	NA	NA	NA	NA	NA	NA
	TCDD	1	58.2	4.84	10.3	2.15	75.5	NA	NA	NA	NA	NA
		2	30.8	3.51	12.8	2.02	49.1	20.7	2.38	21.4	3.31	47.8
		Average	44.5	4.18	11.6	2.09	62.3	20.7	2.38	21.4	3.31	47.8
		RPD	61.6	31.9	21.6	6.24	NA	NA	NA	NA	NA	NA
	HxCDD	1	67.5	4.94	3.46	1.16	77.1	NA	NA	NA	NA	NA
		2	33.8	4.74	5.47	0.915	44.9	24.9	2.41	8.08	1.92	37.3
		Average	50.7	4.84	4.47	1.04	61.0	24.9	2.41	8.08	1.92	37.3
		RPD	66.5	4.13	45.0	23.6	NA	NA	NA	NA	NA	NA
	OCDD	1	77.1	11.2	2.62	0.517	91.4	NA	NA	NA	NA	NA
		2	57.8	8.71	2.67	0.326	69.5	49.4	4.9	5.38	1.53	61.2
		Average	67.5	10.0	2.65	0.421	80.5	49.4	4.9	5.38	1.53	61.2
		RPD	28.6	25.0	1.89	45.3	NA	NA	NA	NA	NA	NA
							$\bar{x}$ = 68.1					$\bar{x}$ = 49.5
							S = 15.1					S = 10.3
							RSD = 22.2%					RSD = 20.7%

The largest variability between the replicates at the low temperature, high spike samples was observed on the cyclone/filter subsamples, and of these, it was observed on the HxCDF, TCDD, and HxCDDs. This may be indicative of variable trapping of these congeners on the cyclone/filter. No evaluation of precision of the field samples for the high temperature, high spike sample trains can be made because one of the replicate trains leaked, invalidating its results.

8.4.3 Recovery of Dynamic Spikes, Outlet

Table 8-5 presents the results of the recoveries of the dynamic spikes at the outlet location.

The average of the sums of recovery for each sampling train ranged from 62.9% to 107%. The high recovery was for the low spike, high filter box temperature sampling train. The relative standard deviations ranged from 12% to 24%.

In general, precision between the field replicates of the outlet samples was lower than the inlet samples. Fifty-eight of 80 replicate values had RPDs exceeding 35%. For the low spike, low filter box temperature run, the relative percent difference between the replicate recoveries of every congener collected in the front half, back half, and XAD exceeded 35%. However, all of the samples from Stack Port 3 had high amounts recovered on the back-half and low on the XAD, whereas the samples from Stack Port 4 exhibited the opposite, namely higher recoveries in the XAD than in the back half. This may be the result of differential coating of the Apiezon in both trains; i.e., if a train's back half has a dense coating or areas of dense coating, it can be expected that the back half will trap more material than another train that has a thin, uniform coating. For the sampling trains from the low spike, high filter box temperature run, a large degree of variability can be observed in the replicate front component recoveries. However, the actual sample concentrations were close to the detection limits, so that random variability can be important. For the high spike, low filter box temperature run, significant variability was encountered for all congeners from the front components.

TABLE 8-5. PERCENT RECOVERY OF DYNAMIC SPIKES FROM THE OUTLET SAMPLING LOCATION MM5 SAMPLING TRAINS

Spike level (ng)	^{13}C-Labeled analyte	Stack location	Filter box temperature = 250°F					Filter box temperature = 420°F				
			Cyclone/ filter	Front half	Back half	XAD	Sum of recov.	Cyclone/ filter	Front half	Back half	XAD	Sum of recov.
25	HxCDF	3	1.29	0.255	62.5	17.6	81.6	1.08	0	80.7	21.8	103.6
		4	1.29	0.461	29.4	38.2	69.4	2.62	0.764	49.9	27.8	81.1
		Average	1.29	0.358	46.0	28	75.5	1.85	0.382	65.3	24.8	92.3
		RPD	0.00	57.5	72.0	73.8	NA	83.2	200	47.2	24.2	NA
	OCDF	3	3.28	0.294	49.8	6.74	60.1	1.68	0	111	33.8	146.5
		4	3.55	1.12	25.0	29.6	59.3	4.44	0.995	83.5	32.5	121.4
		Average	3.42	0.707	37.4	18.2	59.7	3.06	0.498	97.3	33.2	134.0
		RPD	7.91	117	66.3	126	NA	90.2	200	28.3	3.92	NA
	TCDD	3	0.898	0.187	51.3	15.7	68.1	1.24	0	70.7	24.2	96.1
		4	0.755	0.0610	24.6	52.3	77.7	2.81	1.01	45.5	23.5	72.8
		Average	0.827	0.124	38.0	34.0	72.9	2.03	0.505	58.1	23.9	84.5
		RPD	17.3	102	70.4	108	NA	77.5	200	43.4	2.94	NA
	HxCDD	3	2.07	1.12	49.5	14.5	67.2	1.75	0.735	76.5	22.5	101.5
		4	2.36	1.26	25.0	31.2	59.8	3.17	1.38	50.9	27.0	82.5
		Average	2.22	1.19	37.3	22.9	63.5	2.46	1.06	63.7	24.8	92.0
		RPD	13.1	11.8	65.8	73.1	NA	57.7	61.0	40.2	18.2	NA
	OCDD	3	3.50	0.312	47.1	8.61	59.5	2.13	0	106	33.5	141.1
		4	4.42	1.27	22.6	28.7	57.0	5.89	1.23	85.6	32.0	124.7
		Average	3.96	0.791	34.9	18.7	58.3	4.01	0.615	95.8	32.75	133.2
		RPD	23.2	121	70.3	108	NA	93.8	200	21.3	4.58	NA
							$\bar{x}$ = 66.0					$\bar{x}$ = 107
							S = 8.43					S = 25.6
							RSD = 12.8%					RSD = 23.8%

(continued)

TABLE 8-5 (continued)

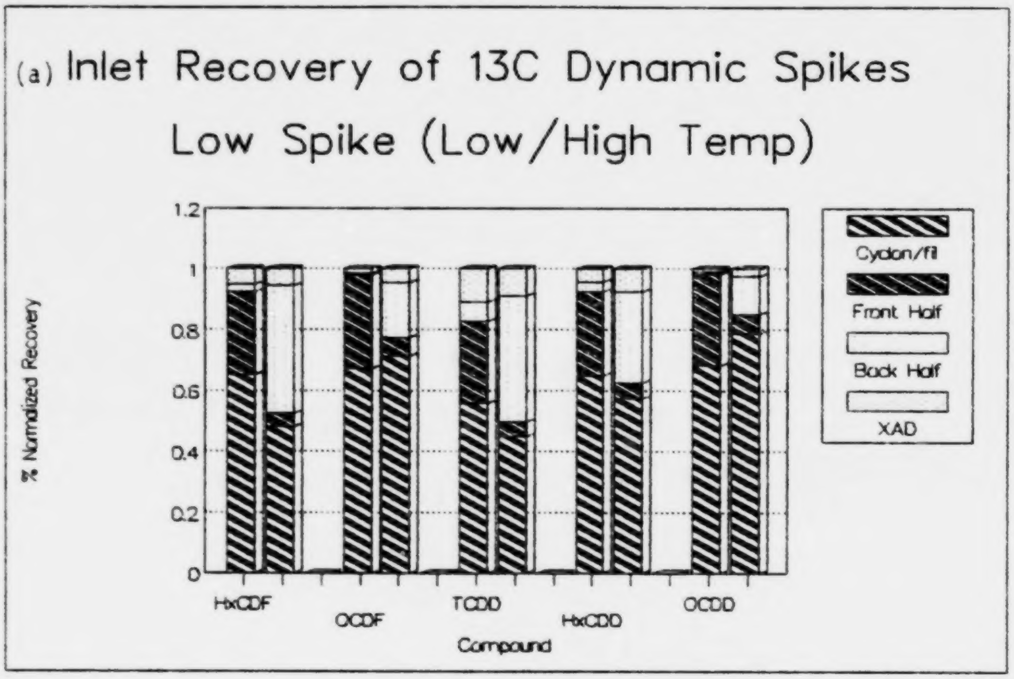
Spike level (ng)	^{13}C-Labeled analyte	Stack location	Filter box temperature = 250°F					Filter box temperature = 420°F				
			Cyclone/ filter	Front half	Back half	XAD	Sum of recov.	Cyclone/ filter	Front half	Back half	XAD	Sum of recov.
500	HxCDF	3	4.99	0.677	67.2	7.43	80.3	2.47	0.214	46.5	6.45	55.6
		4	8.27	1.18	46.2	13.5	69.2	3.52	0.0422	46.4	28.1	78.1
		Average	6.63	0.929	56.7	10.5	74.7	3.00	0.128	46.5	17.3	66.8
		RPD	49.5	54.2	37.0	58.0	NA	35.1	134	0.22	125	NA
	OCDD	3	12.6	1.59	66.9	8.01	89.1	4.41	0.470	59.2	5.49	69.6
		4	25.9	4.03	47.9	8.27	86.1	3.47	0.0635	30.8	12.0	46.3
		Average	19.3	2.81	57.4	8.14	87.6	3.94	0.267	45.0	8.75	58.0
		RPD	69.1	86.8	33.1	3.19	NA	23.9	152	63.1	74.4	NA
	TCDD	3	4.30	0.521	69.1	9.92	83.8	2.31	0.143	46.2	9.25	57.9
		4	6.54	0.833	49.9	15.3	72.6	3.11	0.0449	43.1	31.7	78.0
		Average	5.42	0.677	59.5	12.6	78.2	2.71	0.0940	44.7	20.5	67.9
		RPD	41.3	46.1	32.3	42.7	NA	29.5	104	6.94	110	NA
	HxCDD	3	5.29	0.705	61.5	6.53	74.0	2.47	0.299	43.6	9.21	55.6
		4	9.53	1.26	40.4	10.9	62.1	3.80	0.105	44.0	24.5	72.4
		Average	7.41	0.983	51.0	8.72	68.1	3.14	0.202	43.8	16.9	64.0
		RPD	57.2	56.5	41.4	50.1	NA	42.4	96.0	0.91	90.7	NA
	OCDD	3	13.7	1.80	64.7	8.01	88.2	5.04	0.487	59.3	8.94	73.8
		4	30.1	4.22	43.1	8.63	86.1	2.47	0.0626	29.4	10.2	42.1
		Average	21.9	3.01	53.9	8.32	87.1	3.76	0.275	44.4	9.57	57.9
		RPD	74.9	80.4	40.1	7.45	NA	68.4	154	67.4	13.2	NA
							$\bar{x}$ = 79.2					$\bar{x}$ = 62.9
							S = 9.19					S = 13.3
							RSD = 11.6%					RSD = 20.9%

8.4.4 Effect of Filter Box Temperature on Dynamic Spike and Native Dioxin and Furan Distribution in the Sampling Train

In order to better understand the processes occurring within the sampling train, the average recoveries for each subsample in the train were normalized to the sum of these recoveries and plotted as stacked bar plots in Figures 8-1 and 8-2 for the dynamic spikes at the inlet and outlet. For each set of congeners, consecutive stacked bars represent low and high filter box temperatures, respectively.

For the ^{13}C-labeled, dynamically spiked compounds collected at the inlet (Figure 8-1), there is a change in the overall distribution of each one favoring the back part (back half plus XAD) of the sampling train at the higher filter box temperature. This was observed for both the low and high spikes. This suggests that increasing the filter box temperature produces increased mobility of dioxins and furans past the cyclone/filter assembly to the back part of the train. This could be the result of several scenarios.

The first scenario involves incorporation of the spiked material into the gaseous phase from the flue to the sampling train. Upon encountering the particulate material trapped in the filter assembly, the spiked components are sorbed to these particles and thus do not break past the filter to the back part of the sampling train. At the higher filter box temperature, the adsorptivity of the particles is effectively decreased, and the spiked material is essentially sorbed to a lesser extent, passing directly through to the back part of the train. For the dynamic spikes, this is the most probable scenario. An alternative scenario is that the spiked material is sorbed by the particulate matter in the flue immediately upon entering in contact, and thereby, when the particles are trapped in the filter, the sorbed material is also effectively trapped. Increasing the temperature of the filter box causes the sorbed material to be desorbed such that it passes through to the back part of the sampling train.



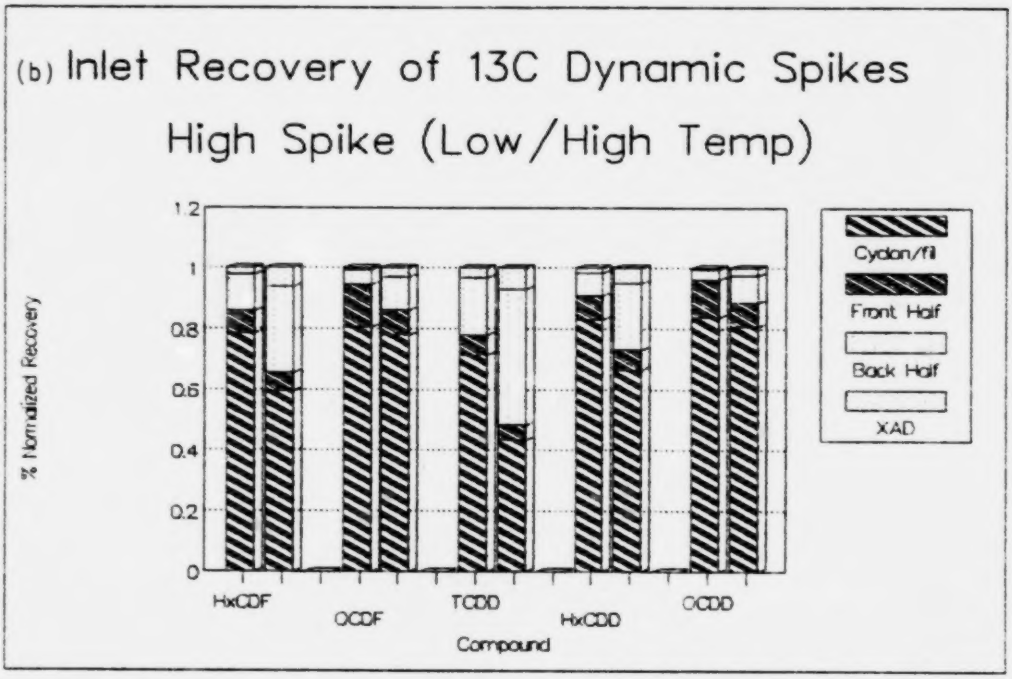
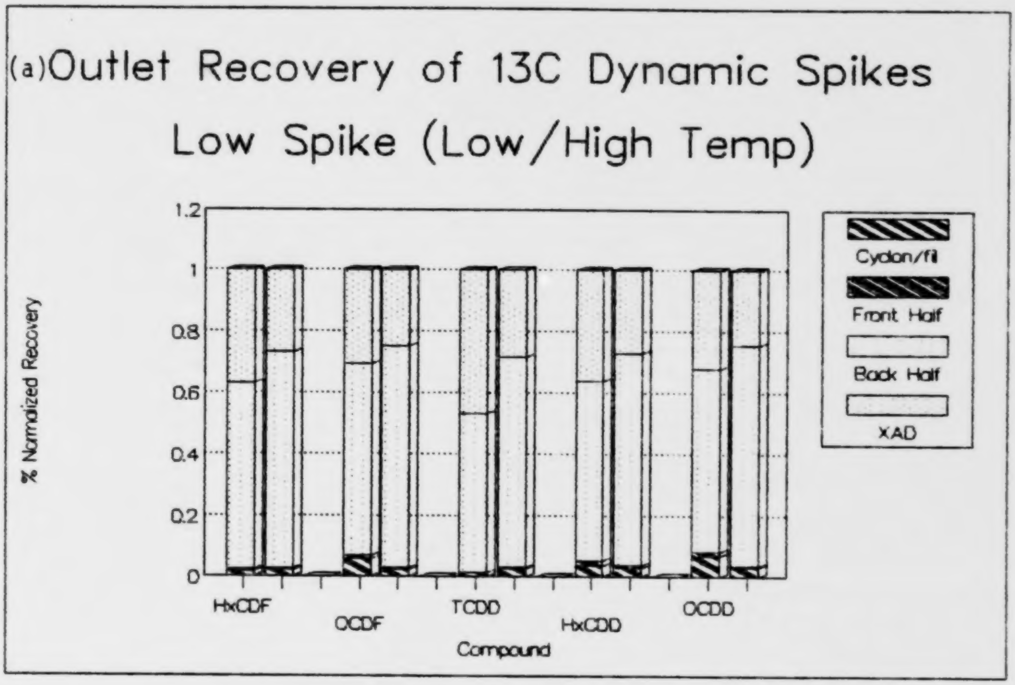


Figure 8-1. Normalized recoveries of ^{13}C dynamically spiked material at the inlet MM5 sampling trains: (a) low (25-ng) dynamic spike, (b) high (500-ng) dynamic spike. Alternating bars represent low and high filter box temperature recoveries, respectively.



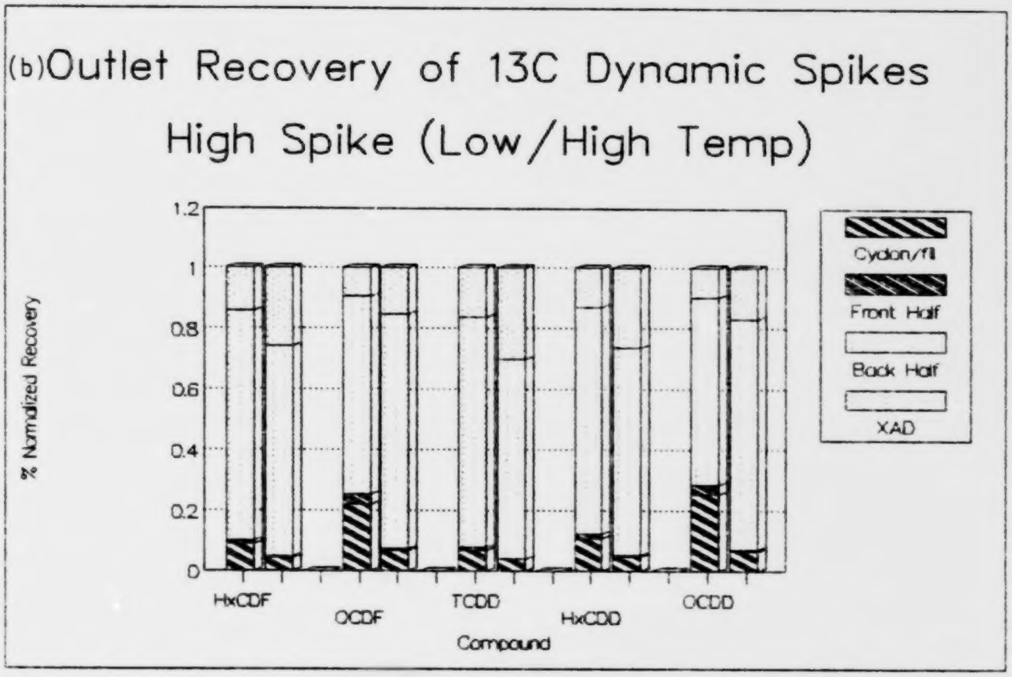


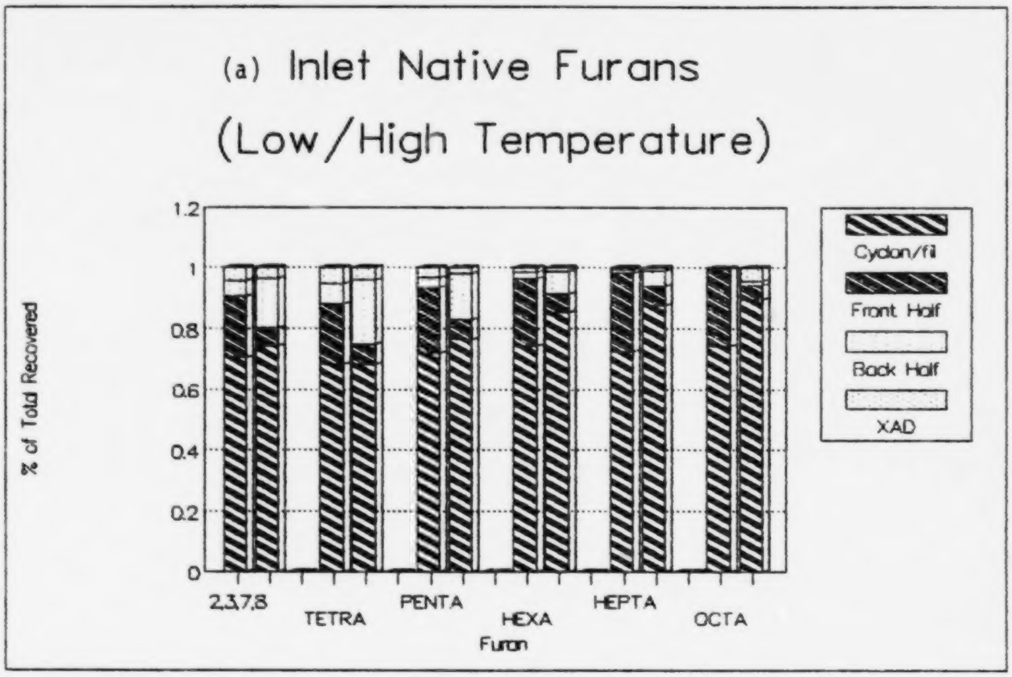
Figure 8-2. Normalized recoveries of ^{13}C dynamically spiked material at the outlet MM5 sampling trains: (a) low (25-ng) dynamic spike, (b) high (500-ng) dynamic spike. Alternating bars represent low and high filter box temperature recoveries, respectively.

The dynamic spike recoveries for the outlet location (Figure 8-2) show that, as was the case for the inlet sampling locations, the higher filter box temperature increased the relative percentage of material being trapped in the back-half train components (back-half glassware and XAD-2 resin) of the sampling train. Note that at low spike levels, the high filter box temperature decreased the amount of ^{13}C-labeled dioxin and furan congeners being trapped on the XAD relative to that collected in the back half, while at high spike levels, a relatively greater proportion of the compounds are trapped in the XAD with high filter box temperatures. A potential explanation for this was described above, related to differential Apiezon-L coating on the trains, and this is not reflected in the bars.

The tabulated results for native dioxins and furans analyzed during this study are presented in Tables A-1, A-2, A-3, and A-4 of Appendix A. The concentrations of each congener in each portion of the sampling train were normalized to their sum and plotted in stacked bar graphs similar to those discussed above. These are shown in Figures 8-3 and 8-4 (discriminated by sampling location and dynamic spike level).

Figures 8-3 and 8-4 show that increasing the filter box temperature had little or no mobilization effect on the native dioxins and furans collected at the inlet. This is in stark contrast to the ^{13}C-labeled dynamic spikes, whereby significant remobilization of these compounds toward the back part of the train was achieved by raising the temperature of the filter box. Figure 8-3 also demonstrates that furans are more easily mobilized by increasing the filter box temperature than dioxins. This would suggest that the native dioxins and furans are largely associated with the particles. The difference between the dioxins and furans likely reflects differences in their chemical structure and ability to sorb to particles.

The dioxins and furans collected at the outlet location are plotted in Figure 8-4. There are striking differences between the trends observed for natives and those for the ^{13}C-labeled dynamic spikes. The latter show a generally smaller proportion of material being trapped in the front part of the train than for the native dioxins and furans.



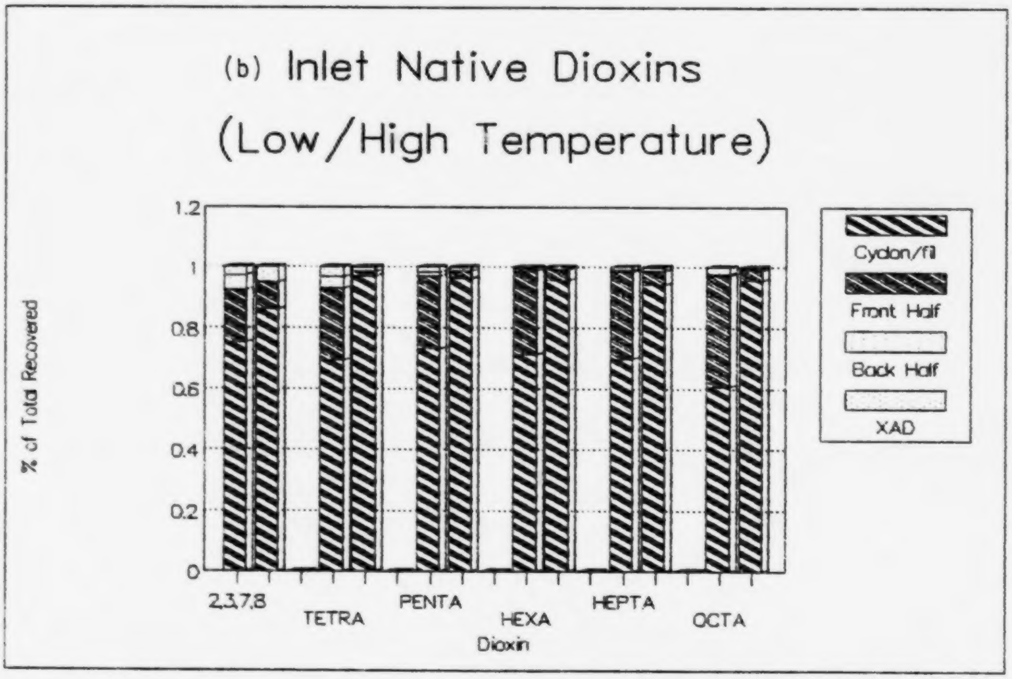


Figure 8-3. Normalized recoveries of native dioxins and furans at the inlet MM5 sampling trains: (a) furans, (b) dioxins. Low and high dynamic spikes were combined; alternating bars represent relative amounts recovered at the low and high filter box temperatures, respectively.

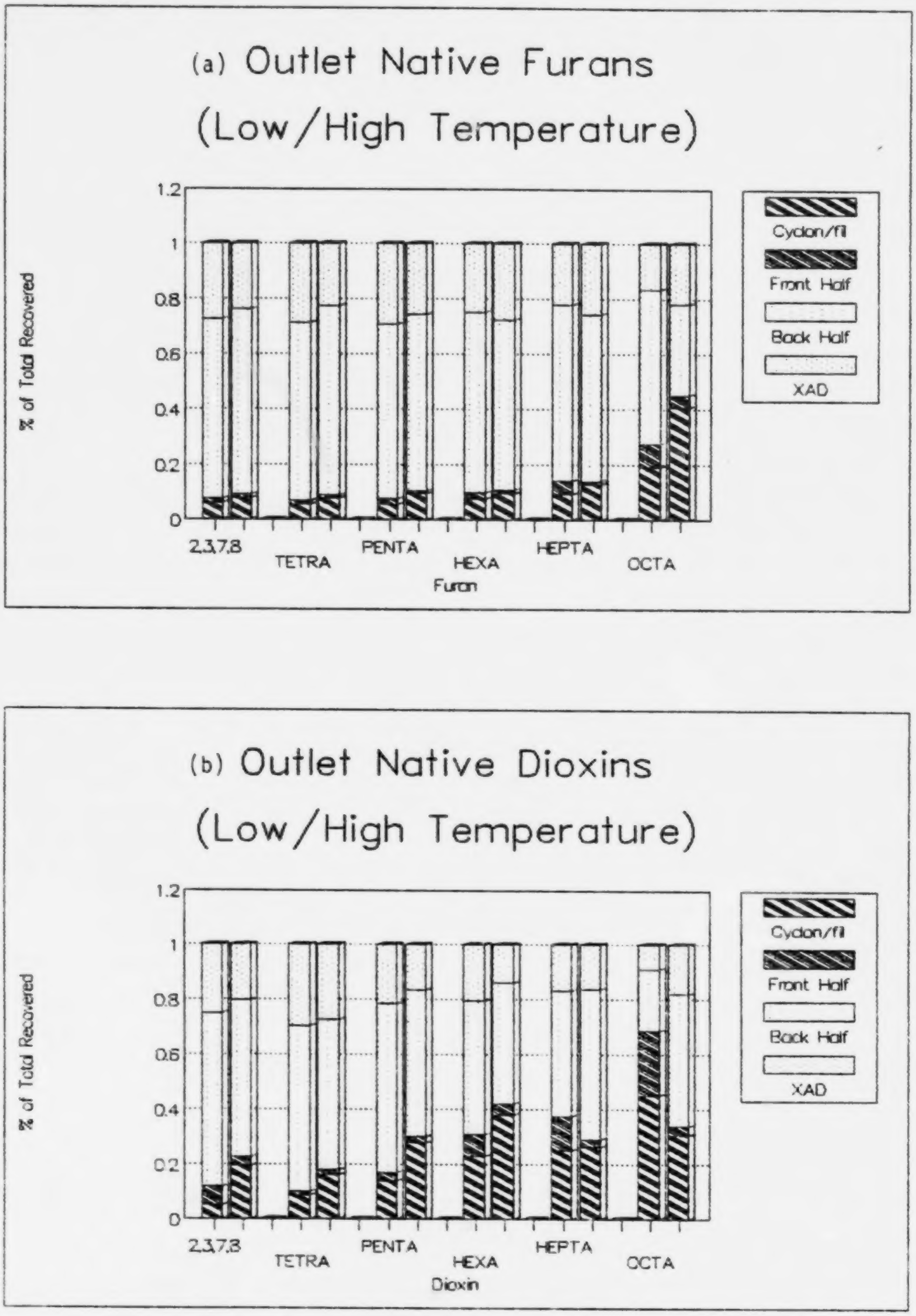


Figure 8-4. Normalized recoveries of native dioxins and furans at the outlet MM5 sampling trains: (a) furans, (b) dioxins. Low and high dynamic spikes were combined; alternating bars represent relative amounts recovered at the low and high filter box temperatures, respectively.

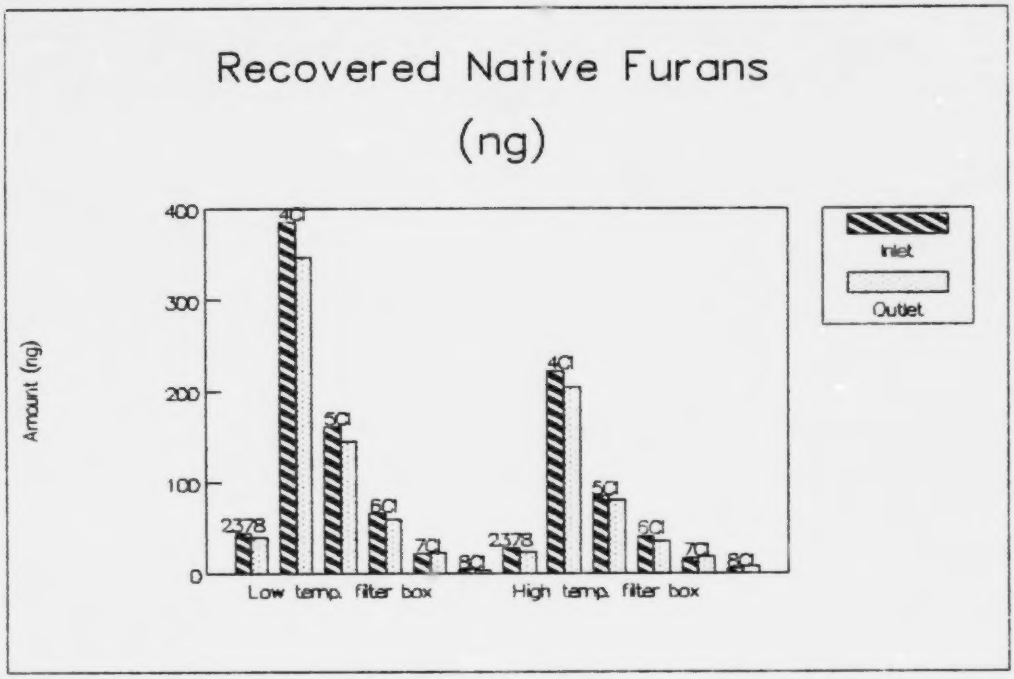
In summary, for the sampling trains from the inlet, increasing the filter box temperature precipitated a movement of ^{13}C-labeled dynamic spikes toward the back part of the sampling train for both dioxins and furans. The lower congeners moved more readily than the more chlorinated species, as was expected given their relative hydrophobicity and thus their tendency to sorb strongly to surfaces. The native furans showed movement toward the back part of the train, but to a lesser extent than the dynamically spiked furans when filter box temperatures were increased. However, the native dioxins did not move at all, in total contrast to the spiked dioxins. All the evidence points to a previous association between flue particles and the native compounds that is dissimilar to that for the spiked compounds with the same particles.

The residence time of the natives in the incinerator system (from incineration to sampling port) is in the order of 10 s or less, whereas the residence time for the dynamic spikes is about 2 s. Kinetic considerations indicate that this is not sufficient time to establish the associations between the particles and the native dioxins and furans. The implication is therefore that the association was established prior to incineration, between the precursors of the solid ash particles and the precursors of the native dioxins and furans. This suggestion is clearly speculative and would require experiments to test the hypothesis.

The results from the outlet sampling trains show differences between those observed at the inlet sampling trains in relation to the effects of higher filter box temperatures in distribution of dioxins and furans. By and large, there was a movement toward the back part of the train for natives as well as for spiked dioxins and furans. Given the differences in the nature of the flue material between the inlet and outlet sampling port locations, it is apparent that this may be related to particulate loading at both points. It would also be expected that if a significant portion of dioxins and furans in the flue are associated to particles, the total amount of these compounds found in the outlet sampling location would be significantly smaller than that found in the inlet sampling location. This is due to the removal of presumably dioxin- and furan-carrying particles in the electrostatic precipitator.

Figure 8-5 presents bar graphs of the total native dioxins and furans collected during this set of experiments. The top graph presents the data for the native furans, and the bottom figure for the native dioxins. Inlet/outlet total average recoveries are displayed by the side-by-side sets of bars for the various compounds.

There were minimal differences in the amounts of furans collected at outlet sampling trains. However, the amount of dioxins collected in the outlet trains were less than at the inlet.



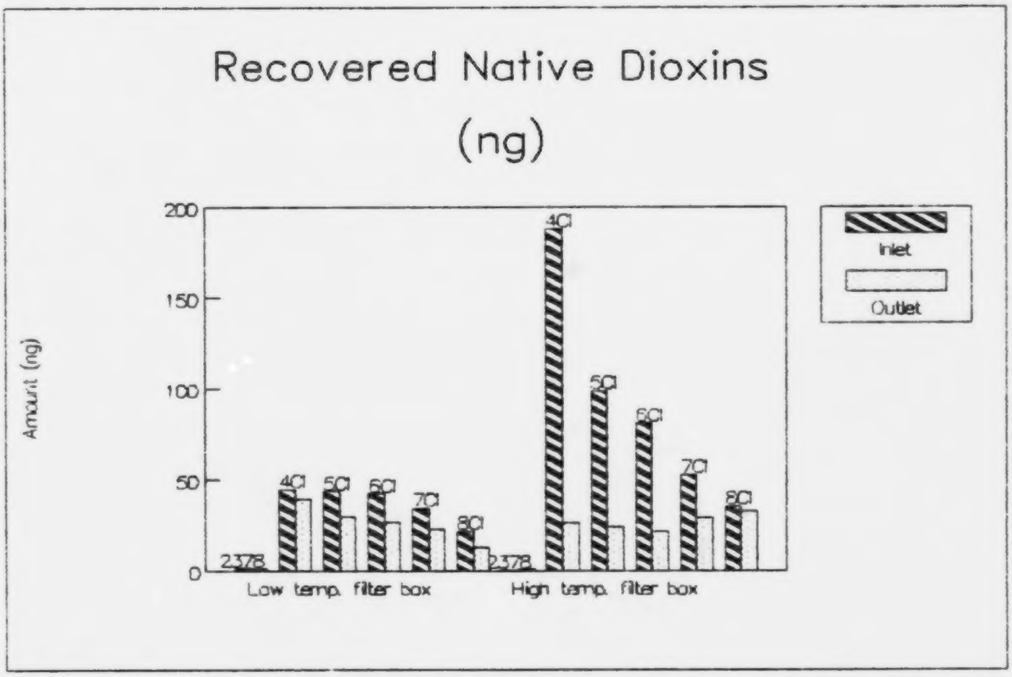


Figure 8-5. Total recovered (ng) dioxins and furans from the inlet and outlet MM5 sampling trains.

SECTION 9.0

REFERENCES

1. Worthy, W. Hazardous Waste: Treatment Technology Grows. Chem. Eng. News, March 8:10-16, 1982.

2. Thomas, L. M. Emission Testing of Combustion Sources for Dioxin. Memorandum to Assistant Administrators and Regional Administrators, May 17, 1984.

3. Eiceman, G. A., R. E. Clement, and F. W. Karasek. Analysis of Fly Ash From Municipal Incinerators for Trace Organic Compounds. Anal. Chem., 51:2343-2350, 1979.

4. Environmental Standard Workshop, Group C Sponsored by the American Society of Mechanical Engineers, U.S. Department of Energy and U.S. Environmental Protection Agency. Analytical Procedures to Assay Stack Effluent Samples and Residual Combustion for Polychlorinated Dibenzo-p-dioxins (PCDD) and Polychlorinated Dibenzofurans (PCDF). September 1984.

5. Ozvacic, V. A Review of Stack Sampling Methodology for PCDDs/PCDFs. Chemosphere, 15:1173-1178, 1986.

6. Cooke, M., R. Litt, K. B. Degner, D. G. Aichele, S. C. Watson, and F. L. DeRoos. Validation of Emission Test Method for Dioxin. Draft Report prepared for the U.S. Environmental Protection Agency, EPA Contract No. 68-02-3745, Work Assignment Nos. 21 and 24, February 1986.

7. Rordorf, B. F. Thermal Properties of Dioxins, Furans and Related Compounds. Chemosphere, 15:1325-1332, 1986.

8. Rordorf, B. F. Thermodynamics and Thermal Properties of Polychlorinated Compounds: The Vapor Pressures and Flow Tube Kinetics of Ten Dibenzo-p-dioxins. Chemosphere, 14:885-892, 1985.

APPENDIX A

NATIVE PCDDs AND PCDFs IN MM5 EXTRACTS FROM THE PHASE 5 TESTS

TABLE A-1. DIOXINS AND FURANS DETERMINED (ng) IN THE INLET SAMPLING LOCATION MM5 SAMPLING TRAINS
(LOW SPIKE RUNS)

			Filter box temperature = 250°F					Filter box temperature = 420°F				
Spike level	Analyte	Stack location	Cyclone/ filter	Front half	Back half	XAD	Sum	Cyclone/ filter	Front half	Back half	XAD	Sum
25	2,3,7,8-TCDF	1	26	15	2.4	3.3	46.7	21	2.4	5	1.5	29.9
		2	35	15	2.1	4.8	56.9	15	1.5	3	0.28	19.8
		Average	31	15	2.3	4.0	51.8	18	1.9	4.0	0.89	24.8
		RPD (%)	30	0	13	37	NA	33	46	50	137	NA
	Total tetra-CDF	1	210	130	25	36	401.0	170	20	50	16	256.0
		2	280	140	23	52	495.0	140	13	31	2.9	186.9
		Average	245	135	24	44	448.0	155	17	41	9.4	221.4
		RPD (%)	29	7.4	8.3	36	NA	19	42	47	139	NA
	Total penta-CDF	1	87	58	4.6	9	158.6	74	7.1	13	3.5	97.6
		2	120	61	4.7	14	199.7	55	5.5	6.0	0.21	66.7
		Average	104	60	4.7	12	179.2	65	6.3	9.5	1.9	82.2
		RPD (%)	32	5.0	2.2	43	NA	29	25	74	177	NA
	Total hexa-CDF	1	37	25	0.83	1.8	64.6	35	3.5	3	1.3	42.8
		2	64	27	1.5	3.2	95.7	26	2.2	1.2	< 0.045	29.4
		Average	51	26	1.2	2.5	80.2	31	2.9	2.1	0.66	36.1
		RPD (%)	53	7.7	58	56	NA	30	46	86	NA	NA
	Total hepta-CDF	1	3.9	7.3	0.13	0.25	11.6	15	1.4	0.61	0.28	17.3
		2	22	9	0.15	0.37	31.5	11	0.84	0.28	< 0.053	12.1
		Average	13	8.2	0.14	0.31	21.6	13	1.1	0.45	0.153	14.7
		RPD (%)	140	21	14	39	NA	31	50	74	NA	NA
	Total octa-CDF	1	1.2	0.85	< 0.041	< 0.017	2.0	4.3	0.29	< 0.41	< 0.15	4.6
		2	4.0	1.5	< 0.036	0.015	5.5	3.0	0.12	< 0.098	< 0.068	3.1
		Average	2.6	1.2	< 0.041	0.012	3.8	3.6	0.20	< 0.41	< 0.15	3.9
		RPD (%)	108	55	NA	NA	NA	36	83	NA	NA	NA

(continued)

TABLE A-1 (continued)

			Filter box temperature = 250°F					Filter box temperature = 420°F				
Spike level	Analyte	Stack location	Cyclone/ filter	Front half	Back half	XAD	Sum	Cyclone/ filter	Front half	Back half	XAD	Sum
25	2,3,7,8-TCDF	1	1.9	0.45	< 0.11	0.10	2.5	0.29	0.084	< 0.23	0.04	0.4
		2	1.1	0.47	0.057	0.13	1.8	0.25	0.048	< 0.60	< 0.069	0.3
		Average	1.5	0.46	0.056	0.12	2.1	0.27	0.066	< 0.60	0.037	0.4
		RPD (%)	53	4.3	NA	26	NA	15	55	NA	NA	NA
	Total tetra-CDD	1	31	17	1.1	3.4	52.5	130	3.6	2.4	0.71	136.7
		2	37	21	1.8	4.4	64.2	260	2.5	1.0	< 0.10	263.5
		Average	34	19	1.5	3.9	58.4	195	3.0	1.7	0.38	200.1
		RPD (%)	18	21	48	26	NA	67	36	82	NA	NA
	Total penta-CDD	1	25	15	0.23	1.1	41.3	82	3.6	0.51	0.21	86.3
		2	36	17	0.61	1.6	55.2	100	2.4	< 0.26	< 0.073	102.4
		Average	36	13	90	37	NA	20	40	NA	NA	NA
	Total hexa-CDD	1	26	17	0.11	0.44	43.5	75	5.2	0.35	0.18	80.7
		2	49	22	0.43	0.79	72.2	72	3.3	< 0.34	< 0.063	75.3
		Average	38	20	0.27	0.61	57.9	74	4.3	0.26	0.11	78.1
		RPD (%)	61	26	119	57	NA	4	45	NA	NA	NA
	Total hepta-CDD	1	14	11	0.046	0.15	25.2	47	3.7	0.57	0.14	51.4
		2	29	13	0.088	0.21	42.3	40	2.2	< 0.077	< 0.043	42.2
		Average	22	12	0.067	0.18	33.7	44	3.0	0.30	0.081	46.8
		RPD (%)	70	17	63	33	NA	16	51	NA	NA	NA
	Total octa-CDD	1	7.9	5.6	0.13	0.17	13.8	32	2.5	0.6	0.35	35.5
		2	19	8.3	0.029	0.072	27.4	26	1.6	0.26	0.18	28.0
		Average	13	7.0	0.080	0.12	20.6	29	2.0	0.43	0.27	31.7
		RPD (%)	83	39	127	81	NA	21	44	79	64	NA

TABLE A-2. DIOXINS AND FURANS DETERMINED (ng) IN THE OUTLET SAMPLING LOCATION MM5 SAMPLING TRAINS
(LOW SPIKE RUNS)

			Filter box temperature = 250°F					Filter box temperature = 420°F				
Spike level	Analyte	Stack location	Cyclone/ filter	Front half	Back half	XAD	Sum	Cyclone/ filter	Front half	Back half	XAD	Sum
25	2,3,7,8-TCDF	3	0.38	0.094	19	5.1	24.6	1.0	0.16	4.1	1.6	6.9
		4	0.79	0.60	9.4	16	26.8	0.30	0.035	2.7	1.6	4.6
		Average	0.58	0.35	14.2	10.6	25.7	0.65	0.10	3.4	1.6	5.7
		RPD (%)	70	146	68	103	NA	108	128	41	0	NA
	Total tetra-CDF	3	3.3	0.45	160	43	206.8	8.1	1.4	36	11	56.5
		4	5.3	4.1	79	130	218.4	2.4	0.072	22	11	35.5
		Average	4.3	2.3	120	87	212.6	5.3	0.74	29	11	46.0
		RPD (%)	47	160	68	101	NA	109	179	48	0	NA
	Total penta-CDF	3	1.4	0.36	53	20	74.8	3.6	0.57	9.5	6.0	19.7
		4	3.3	2.7	28	54	88.0	1.1	0.073	6.8	6.0	14.0
		Average	2.3	1.5	41	37	81.4	2.4	0.32	8.2	6.0	16.8
		RPD (%)	81	153	62	92	NA	106	155	33	0	NA
	Total hexa-CDF	3	0.67	0.20	29	9.5	39.4	1.8	0.23	4.7	3.0	9.7
		4	1.6	1.7	17	21	41.3	0.48	0.18	5.0	3.0	8.7
		Average	1.1	0.9	23	15	40.3	1.1	0.21	4.8	3.0	9.2
		RPD (%)	82	158	52	75	NA	116	24	6.2	0	NA
	Total hepta-CDF	3	0.42	0.14	10	2.5	13.1	0.86	0.10	2.4	1.8	5.2
		4	0.29	1.3	6.4	7.5	15.5	0.27	0.060	3.4	2.0	5.7
		Average	0.35	0.72	8.2	5.0	14.3	0.56	0.08	2.9	1.9	5.4
		RPD (%)	37	161	44	100	NA	104	50	34	11	NA
	Total octa-CDF	3	0.088	0.057	1.2	0.20	1.5	0.21	< 0.01	< 0.36	0.50	0.7
		4	0.27	0.27	0.71	0.83	2.1	0.069	0.16	0.76	0.29	1.3
		Average	0.18	0.16	1.0	0.52	1.8	0.14	0.083	0.47	0.40	1.1
		RPD (%)	102	130	51	122	NA	101	NA	NA	53	NA

(continued)

TABLE A-2 (continued)

Spike level	Analyte	Stack location	Filter box temperature = 250°F					Filter box temperature = 420°F				
			Cyclone/ filter	Front half	Back half	XAD	Sum	Cyclone/ filter	Front half	Back half	XAD	Sum
25	2,3,7,8-TCDD	3	0.18	< 0.36	0.48	0.14	0.6	< 0.45	< 0.024	< 0.41	0.039	0.0
		4	< 0.036	0.023	0.25	0.35	0.6	0.012	0.035	0.13	< 0.098	0.2
		Average	0.018	0.10	0.36	0.24	0.7	0.12	0.024	0.167	0.044	0.4
		RPD (%)	NA	NA	63	86	NA	NA	NA	NA	NA	NA
	Total tetra-CDD	3	0.30	0.029	18	5.3	23.6	2.1	0.28	2.6	2.7	7.7
		4	1.2	0.58	9.3	19	30.1	0.67	0.08	2.0	0.43	3.2
		Average	0.75	0.30	14	12	26.9	1.4	0.18	2.3	1.6	5.4
		RPD (%)	120	181	64	113	NA	103	114	26	145	NA
	Total penta-CDD	3	0.37	0.029	14	3.9	18.3	2.3	0.25	0.89	1.6	5.0
		4	1.5	0.80	6.2	10	18.5	1.1	0.073	1.0	0.25	2.4
		Average	0.94	0.41	10	7.0	18.4	1.7	0.16	0.95	0.93	3.7
		RPD (%)	121	186	77	88	NA	71	110	12	146	NA
	Total hexa-CDD	3	0.87	0.43	13	6.1	20.4	3.9	0.62	0.77	1.1	6.4
		4	3.7	2.1	7.4	9.5	22.7	2.9	0.18	1.8	0.71	5.6
		Average	2.3	1.3	10	7.8	21.6	3.4	0.40	1.3	0.91	6.0
		RPD (%)	124	132	55	44	NA	29	110	80	43	NA
	Total hepta-CDD	3	0.88	0.55	8.1	2.0	11.5	2.9	0.51	2.4	1.9	7.7
		4	2.9	2.9	4.6	5.6	16.0	2.6	0.060	3.2	1.7	7.6
		Average	1.9	1.7	6.3	3.8	13.8	2.8	0.29	2.8	1.8	7.6
		RPD (%)	107	136	55	95	NA	11	158	29	11	NA
	Total octa-CDD	3	1.1	0.67	7.3	1.0	10.	12.1	0.48	4.1	2.5	9.2
		4	2.4	3.8	2.3	2.7	11.2	2.1	0.16	2.7	1.7	6.7
		Average	1.8	2.2	4.8	1.9	10.6	2.1	0.32	3.4	2.1	7.9
		RPD (%)	74	140	104	92	NA	0	100	41	38	NA

TABLE A-3. DIOXINS AND FURANS DETERMINED (ng) IN THE INLET SAMPLING LOCATION MM5 SAMPLING TRAINS
(HIGH SPIKE RUNS)

Spike level	Analyte	Stack location	Filter box temperature = 250°F					Filter box temperature = 420°F				
			Cyclone/ filter	Front half	Back half	XAD	Sum	Cyclone/ filter	Front half	Back half	XAD	Sum
500	2,3,7,8-TCDF	3	3.9	0.75	43	4.5	52.1	1.7	0.34	27	4.4	33.4
		4	6.6	1.2	39	10	56.8	2.0	0.063	36	12	50.1
		Average	5.3	0.97	41	7.3	54.5	1.9	0.20	32	8.2	41.8
		RPD (%)	51	46	10	76	NA	16	137	29	93	NA
	Total tetra-CDF	3	34	5.4	390	48	477.4	14	2.1	230	33	279.1
		4	51	9.2	310	110	480.2	16	0.13	310	120	446.1
		Average	43	7.3	350	79	478.8	15	1.1	270	77	362.6
		RPD (%)	40	52	23	78	NA	13	177	30	114	NA
	Total penta-CDF	3	17	2.9	180	15	214.9	6.9	0.81	120	6.9	134.6
		4	18	4.9	140	38	200.9	8.0	0.055	110	38	156.1
		Average	18	3.9	160	27	207.9	7.5	0.43	115	22	145.3
		RPD (%)	5.7	51	25	87	NA	15	175	9	139	NA
	Total hexa-CDF	3	7.3	1.4	65	5.9	79.6	4.1	0.55	45	4.1	53.8
		4	12	2.6	52	13	79.6	4.5	< 0.029	44	24	72.5
		Average	10	2.0	59	9.4	79.6	4.3	0.28	45	14	63.1
		RPD (%)	49	60	22	75	NA	9.3	NA	2.2	142	NA
	Total hepta-CDF	3	4.0	0.99	24	1.7	30.7	7.1	0.38	23	1.1	31.6
		4	6.1	1.8	19	3.9	30.8	2.4	0.073	19	8.8	30.3
		Average	5.0	1.4	22	2.8	30.7	4.8	0.23	21	5.0	30.9
		RPD (%)	42	58	23	79	NA	99	136	19	156	NA
	Total octa-CDF	3	1.1	0.23	3.9	< 0.31	5.2	19	0.14	5.5	< 0.55	24.6
		4	2.0	0.63	2.6	0.3	5.5	0.7	< 0.071	2.8	0.86	4.3
		Average	1.6	0.43	3.3	0.23	5.5	9.8	0.088	4.2	0.57	14.7
		RPD (%)	58	93	40	NA	NA	186	NA	65	NA	NA

(continued)

TABLE A-3 (continued)

Spike level	Analyte	Stack location	Filter box temperature = 250°F Cyclone/ filter	Front half	Back half	XAD	Sum	Filter box temperature = 420°F Cyclone/ filter	Front half	Back half	XAD	Sum
500	2,3,7,8-TCDD	3	0.16	< 0.040	1.6	0.21	2.0	0.064	< 0.062	0.92	0.31	1.3
		4	0.12	< 0.096	1.3	0.41	1.8	0.10	< 0.052	1.2	0.57	1.9
		Average	0.14	< 0.096	1.5	0.31	1.9	0.082	< 0.062	1.1	0.44	1.6
		RPD (%)	29	NA	21	65	NA	44	NA	26	59	NA
	Total tetra-CDD	3	6.3	0.8	41	4.4	52.5	3.1	0.2	39	3.4	45.7
		4	8.9	0.96	32	9.7	51.6	3.2	< 0.052	25	21	49.2
		Average	7.6	0.88	37	7.0	52.0	3.2	0.11	32	12	47.5
		RPD (%)	34	18	25	75	NA	3.2	NA	44	144	NA
	Total penta-CDD	3	9.6	1.3	34	1.1	46.0	4.6	0.43	54	1.5	60.5
		4	9.3	1.7	23	3.3	37.3	4.2	< 0.024	20	5.5	29.7
		Average	9.4	1.5	29	2.2	41.7	4.4	0.2	37	3.5	45.1
		RPD (%)	3	27	39	100	NA	9.1	NA	92	114	NA
	Total hexa-CDD	3	9.8	2.5	18	0.91	31.2	7.5	1.2	34	1.2	43.9
		4	13	3.8	14	2.2	33.0	6.6	0.061	16	8.3	31.0
		Average	11	3.1	16	1.6	32.1	7.0	0.63	25	4.8	37.4
		RPD (%)	28	41	25	83	NA	13	181	72	149	NA
	Total hepta-CDD	3	9.8	3.0	17	1.3	31.1	8.5	1.5	58	1.7	69.7
		4	14	5.2	13	2.4	34.6	8.6	0.14	17	7.1	32.8
		Average	12	4.1	15	1.9	32.9	8.6	0.82	38	4.4	51.3
		RPD (%)	35	54	27	59	NA	1.2	166	109	123	NA
	Total octa-CDD	3	9.7	2.6	< 0.43	< 0.30	12.3	33	1.7	50	2.8	87.5
		4	13	5.5	< 0.41	< 0.34	18.5	7.0	0.77	12	7.8	27.6
		Average	11	4.0	< 0.43	< 0.34	15.4	20	1.2	31	5.3	57.5
		RPD (%)	29	72	NA	NA	NA	130	75	123	94	NA

TABLE A-4. DIOXINS AND FURANS DETERMINED (ng) IN THE OUTLET SAMPLING LOCATION MM5 SAMPLING TRAINS (HIGH SPIKE RUNS)

			Filter box temperature = 250°F					Filter box temperature = 420°F				
Spike level	Analyte	Stack location	Cyclone/ filter	Front half	Back half	XAD	Sum	Cyclone/ filter	Front half	Back half	XAD	Sum
500	2,3,7,8-TCDF	1	39	5.6	2.2	0.25	47.0	NA	NA	NA	NA	NA
		2	23	2.7	2.1	0.26	28.1	24	1.3	5.1	1.0	31.4
		Average	31	4.2	2.2	0.26	37.6	24	1.3	5.1	1.0	31.4
		RPD (%)	52	70	4.7	3.9	NA	NA	NA	NA	NA	NA
	Total tetra-CDF	1	340	36	24	1.9	401.9	NA	NA	NA	NA	NA
		2	190	23	25	3.5	241.5	150	12	53	8.8	223.8
		Average	265	30	25	2.7	321.7	150	12	53	8.8	223.8
		RPD (%)	57	44	4.1	59	NA	NA	NA	NA	NA	NA
	Total penta-CDF	1	150	18	5.8	0.26	174.1	NA	NA	NA	NA	NA
		2	97	8.6	5.5	0.27	111.4	65	5	16.0	1.4	87.4
		Average	124	13	5.7	0.27	142.7	65	5	16.0	1.4	87.4
		RPD (%)	43	71	5.3	3.8	NA	NA	NA	NA	NA	NA
	Total hexa-CDF	1	56	8.2	1.6	< 0.15	65.8	NA	NA	NA	NA	NA
		2	34	4.2	0.89	< 0.12	39.1	40	2.0	4.0	0.33	46.3
		Average	45	6.2	1.2	< 0.15	52.4	40	2.0	4.0	0.33	46.3
		RPD (%)	49	65	57	NA	NA	NA	NA	NA	NA	NA
	Total hepta-CDF	1	24	4.2	0.36	< 0.14	28.6	NA	NA	NA	NA	NA
		2	15	1.8	0.24	< 0.075	17.0	17	0.99	1.3	0.22	19.5
		Average	20	3.0	0.30	< 0.14	22.8	17	0.99	1.3	0.22	19.5
		RPD (%)	46	80	40	NA	NA	NA	NA	NA	NA	NA
	Total octa-CDF	1	3.8	1.2	< 0.068	< 0.19	5.0	NA	NA	NA	NA	NA
		2	3.0	0.44	< 0.14	< 0.12	3.4	5.1	0.21	0.21	0.50	6.0
		Average	3.4	0.82	< 0.14	< 0.19	4.2	5.1	0.21	0.21	0.50	6.0
		RPD (%)	24	93	NA	NA	NA	NA	NA	NA	NA	NA

(continued)

TABLE A-4 (continued)

			Filter box temperature = 250°F					Filter box temperature = 420°F				
Spike level	Analyte	Stack location	Cyclone/ filter	Front half	Back half	XAD	Sum	Cyclone/ filter	Front half	Back half	XAD	Sum
500	2,3,7,8-TCDD	1	1.3	0.17	0.036	< 0.15	1.5	NA	NA	NA	NA	NA
		2	< 0.58	0.086	< 0.21	< 0.14	0.1	0.79	< 0.045	< 0.23	< 0.025	0.8
		Average	0.80	0.13	0.070	< 0.15	1.0	0.79	< 0.045	< 0.23	< 0.025	0.8
		RPD (%)	NA	66	NA	NA	NA	NA	NA	NA	NA	NA
	Total tetra-CDD	1	30	6.9	2.0	< 0.15	38.9	NA	NA	NA	NA	NA
		2	20	2.2	0.98	< 0.12	23.2	170	2.0	3.4	0.31	175.7
		Average	25	4.6	1.5	< 0.15	31.0	170	2.0	3.4	0.31	175.7
		RPD (%)	40	103	68	NA	NA	NA	NA	NA	NA	NA
	Total penta-CDD	1	35	8.5	0.94	< 0.38	44.4	NA	NA	NA	NA	NA
		2	30	2.6	0.27	0.39	33.3	100	2.0	1.6	0.21	103.8
		Average	33	5.5	0.60	0.29	38.9	100	2.0	1.6	0.21	103.8
		RPD (%)	15	106	111	NA	NA	NA	NA	NA	NA	NA
	Total hexa-CDD	1	19	8.8	0.36	< 0.19	28.2	NA	NA	NA	NA	NA
		2	23	2.5	< 0.27	< 0.15	25.5	82	1.2	0.80	< 0.019	84.0
		Average	21	5.7	0.25	< 0.19	26.9	82	1.2	0.8	< 0.019	84.0
		RPD (%)	19	112	NA	NA	NA	NA	NA	NA	NA	NA
	Total hepta-CDD	1	20	11	0.22	< 0.12	31.2	NA	NA	NA	NA	NA
		2	34	4.3	< 0.22	1.1	39.4	56	1.8	0.83	< 0.24	59.6
		Average	27	7.7	0.17	0.58	35.4	56	1.8	0.83	< 0.24	58.6
		RPD (%)	52	88	NA	NA	NA	NA	NA	NA	NA	NA
	Total octa-CDD	1	< 0.50	14	0.12	< 0.29	14.1	NA	NA	NA	NA	NA
		2	26	4.1	< 0.31	1.7	31.8	39	< 0.047	< 0.23	< 0.27	39.0
		Average	13	9.1	0.14	0.92	23.2	39	< 0.047	< 0.23	< 0.27	39.0
		RPD (%)	NA	109	NA	NA	NA	NA	NA	NA	NA	NA

APPENDIX B

ANALYTICAL PROTOCOL FOR PCDDs AND PCDFs IN STACK EMISSIONS

The analytical procedures used by MRI for PCDD/PCDF analysis are based on "Analytical Procedures to Assay Stack Effluent Samples and Residual Combustion Products for Polychlorinated Dibenzo-*p*-dioxins (PCDD) and Polychlorinated Dibenzofurans (PCDF)," a draft ASME protocol dated September 18, 1984. Any deviations from the ASME method normally made by MRI are noted in these procedures. The extraction method for aqueous samples (i.e., scrubber water and MM5 condensate samples) is based on EPA Method 8280 (SW-846), "The Analysis of Polychlorinated Dibenzo-*p*-dioxins and Polychlorinated Dibenzofurans." The column cleanup procedure is based on the EPA Region VII September 1983 protocol, "Determination of 2,3,7,8-TCDD in Soil and Sediment."

1.0 Glassware Cleaning and Preparation

1.1 Glassware (Major Items) Needed for Field Sampling

The glassware to be prepared for use by the field sampling crew may include but is not limited to the following.

1.1.1 One-quart or 1-gal. wide-mouth jars with Teflon®-lined caps (collection of non-liquid waste samples and bottom ash samples).

1.1.2 One-quart narrow-mouth amber glass bottles with Teflon®-lined caps (collection of liquid waste samples).

1.1.3 One-gallon narrow-mouth amber glass bottles with Teflon®-lined caps (collection of aqueous samples).

1.1.4 Sixteen-ounce wide-mouth jars (collection of particulate filters and particle sizing stage samples).

1.1.5 XAD-2 adsorbent traps.

These items will be prepared by the Environmental Chemistry Section and supplied to the sampling personnel prior to each burn. The actual number required is to be specified by the field sampling crew chief.

1.2 Glassware Cleaning

1.2.1 Wash all glassware in hot, soapy water (use ISOCLEAN non-ionic soap, Micro, Alconox, or equivalent and a clean brush).

1.2.2 Rinse with tap water (5x), deionized water (3x), and bulk acetone (2x).

1.2.3 Air dry and cover open ends of glassware with solvent rinsed aluminum foil and store in appropriate drawers.

1.2.4 Any glassware that gives an indication of still being dirty, i.e., the water and acetone rinses do not 'sheet,' should be recleaned by soaking in concentrated sulfuric acid overnight then rinsed as in Section 1.2.2.

1.2.5 Before actual use, clean glassware and Teflon liners from storage drawers should be rinsed with high purity acetone followed by a 2x rinse with the appropriate solvent to be use in the method. Glassware for field sampling should be rinsed a final time with methylene chloride.

1.2.6 Glassware used for extraction, concentration and cleanup procedures are numbered as a set. Such glassware is to be used in a set.

1.2.7 A final rinse of the glassware sets with the appropriate solvent should be collected in a vial, labelled to note glassware type and set, and archived as a glassware rinse.

1.2.8 The dram vials, reacti-vials, and autosampler vials are rinsed 2x with the solvent to be used and allowed to air dry.

1.2.9 When required, dram vials may be precalibrated by dispersing a measured volume of the appropriate solvent into the vial and etching the glass at the bottom of the miniscus. Precalibrated vials are to be rerinsed with the appropriate solvent and allowed to dry.

1.2.10 Vial caps are to be lined with solvent-rinsed Teflon®-liners.

1.2.11 After use, glassware is to be rinsed once with extraction solvent and once with bulk acetone before detergent washing.

1.3 Deviations from ASME 1984 Draft Protocol

1.3.1 The glassware rinsing procedure discussed in Section 1.2.2 through 1.2.5 deviates from the ASME method which specifies final rinsing with methanol (3x), methylene chloride (3x), and drying in a 100°C oven. However, MRI will screen by GC/MS a representative set of glassware rinses to insure that no analytes of interest are present.

2.0 Sorbent Cleanup and Preparation

XAD-2 is used to collect semivolatiles in the Modified Method 5 sampling train.

2.1 XAD-2 Cleanup and Trap Preparation

2.1.1 Extraction and fluidation

A batch of XAD-2 adsorbent (Alltech Assoc./Applied Science, 20/50 mesh, 90 Å pore size, preextracted for EPA extraction method) is placed into a giant Soxhlet extraction apparatus and extracted for 22 hr with methylene chloride.

The XAD-2 is then placed into an evaporating dish lined with hexane rinsed aluminum foil, placed in a hood and dried for 12 hr. The evaporating dish is lined with aluminum foil to prevent possible contamination of the XAD-2 resin from the dish. Prerinsed aluminum foil is placed over the XAD-2 to keep particulate matter from falling into the evaporating dish during drying.

Glass wool (preextracted with methylene chloride as outlined in Section 2.4.1) is placed in the bottom of a 1-L continuous extraction column. The XAD-2 adsorbent is next placed into the column (~ 1,000 g/extraction column). A stream of high purity (5-9) tank nitrogen is passed for 16 hr through a bed of 50% activated carbon 50% molecular sieve and then into the extraction column. The rate of N_2 flow should gently dry the resin. Excessive fluidation may cause the XAD-2 particles to break up. The hydrocarbon (activated charcoal) trap consists of a 8 x 1 1/2 in. stainless steel case with stainless steel frits on the inlet and outlet. All lines connecting the N_2 tank to the column should be Teflon® or precleaned copper tubing.

2.1.2 Storage of extracted XAD-2

If the precleaned XAD-2 resin is not to be used immediately (within 2 weeks) it should be stored under high purity methanol.

2.1.3 Packing the XAD trap

2.1.3.1 Wet slurry method: Place a wad of glass wool (preextracted with methylene chloride) into the bottom of a precleaned XAD-2 cartridge. The XAD trap is packed just prior to use in the field (not to extend longer than 2 weeks prior to use). Use just enough glass wool to cover the glass frit. Add XAD-2 resin to fill the cartridge to the top of the curved section. Additional methanol is added to wash the resin from the sides of the cartridge to insure there are no air pockets. Do not tap the cartridge. Packing the resin too tightly may plug the sample train during sampling. Add enough glass wool (preextracted) into the top of the cartridge to ensure the resin will not leak out. Attach the cartridge to the prepurified nitrogen system described in Section 2.1.1 and dry for 15 min. Insert bushings and ferrules into both ends of the cartridge tightly with hexane rinsed aluminum foil. Pack the cartridge to ensure safe delivery to the field site.

2.1.3.2 Dry method: The XAD-2 resin is packed the same as the slurry method described above with the following exceptions:

(a) Methanol is not used to wash the resin into the cartridge.

(b) Fluidation is not required after packing the cartridge.

Dry method is to be used unless time requirements do not allow.

2.2 Cleanup and Preparation of Adsorbents Used in the Analytical Procedures

2.2.1 The following adsorbents are to be extracted individually in a giant Soxhlet extractor.

- Na_2SO_4 (anhydrous, granular, Fisher Scientific)
- Acid alumina (Bio-Rad, AG4 100/200 mesh)
- Silica gel (Curtin Matheson, Kiesel Gel 60, 70-230 mesh)

2.2.2 Soxhlet extraction procedure for the 12-L giant Soxhlet

2.2.2.1 Charge the Soxhlet by adding 6 L $MeCl_2$ in the 12 L round bottom flask.

2.2.2.2 Add boiling chips (silicon carbide) to the 12 L round bottom flask.

2.2.2.3 Place preextracted regular glass wool in bottom of Soxhlet extractor to prevent adsorbents from entering into the Soxhlet arm. Add the adsorbent and wet with 1 L $MeCl_2$.

2.2.2.4 Extract overnight, 16-22 hr at a cycle rate of 3 cycles/hr.

2.2.2.5 Remove the adsorbent from the extractor and air dry in hexane-rinsed aluminum foil-lined evaporating dishes until solvent odor is no longer detected (- 4 hr).

2.2.3 Adsorbent activation procedure

2.2.3.1 Na_2SO_4: Ensure that the Na_2SO_4 is dry. Transfer the air-dried Na_2SO_4 to small evaporating dishes and heat in a muffle furnace at 400°C for 4 hr.

Store the Na_2SO_4 in a clean glass jar covered with hexane-rinsed foil in a oven at 130°C.

2.2.3.2 Acid alumina: Transfer air-dried acid aluminum to clean glass jar and activate in an oven at 190°C for 24 hr.

Store acid alumina in a clean glass jar covered with hexane-rinsed foil in an oven at 190°C.

2.2.3.3 Silica gel: Transfer air-dried silica gel to a clean glass jar and activate in an oven at 130°C for 24 hr.

Store silica gel in a clean glass jar covered with hexane-rinsed foil in an oven at 130°C.

2.3 Cleanup and Preparation of Glass Wool and Boiling Chips

2.3.1 Glass wool (Soxhlet extraction)

2.3.1.1 Add approximately 6 L of methylene chloride to a 12-L round bottom flask. Add boiling chips (silicon carbide) to the 12-L round bottom flask.

2.3.1.2 Place regular or silanized glass wool in Soxhlet and wet with 1 L methylene chloride.

2.3.1.3 Extract overnight, 16-22 hr at a cycle rate of 3 cycles/hr.

2.3.1.4 Air dry on hexane-rinsed aluminum foil.

2.3.1.5 Store on bench in clean glass jar with Teflon®-lined screw cap.

2.3.2 Boiling chips

2.3.2.1 Silicon carbide boiling chips (Soxhlet extraction)

2.3.2.1.1 Add approximately 500 mL of methylene chloride to a 1-L round bottom flask. Add boiling chips (solvent extracted 10/40 mesh silicon carbide or equivalent) to the round bottom flask.

2.3.2.1.2 Place preextracted regular glass wool in the bottom of a 71/60 Soxhlet. Add the silicon carbide boiling chips to be extracted and wet with approximately 200 mL of methylene chloride.

2.3.2.1.3 Extract overnight, 16-22 hr at a cycle rate of 3 cycles/hr.

2.3.2.1.4 Air dry on hexane-rinsed aluminum foil.

2.3.2.1.5 Store on bench in a clean glass jar with a Teflon®-lined lid.

2.3.2.2 Berl saddle boiling chips

2.3.2.2.1 Simply crush the Berl Saddles to small pieces and store in a methylene chloride-rinsed vial or jar with Teflon®-lined lid.

2.4 Deviations from ASME 1984 Draft Protocol

2.4.1 The ASME protocol specifies Soxhlet extraction of XAD-2 for 8 hr with water, 22 hr with methanol, 22 hr with methylene chloride, and 22 hr with hexane. MRI will extract XAD-2 for 22 hr with methylene chloride (Section 2.1.1) and then screen the XAD-2 by GC/MS analysis to insure that no analytes of interest are not present.

2.4.2 The adsorbents listed in Section 2.2.3 differ from the ASME required adsorbents. MRI utilizes the EPA Region VII September 1983 protocol for column cleanup.

2.4.3 The ASME protocol specifies a rigorous cleanup procedure for silica gel. MRI will use the method specified in Section 2.2, and then screen the silica gel by GC/MS analysis to ensure that analytes of interest are not present.

2.4.4 The glass wool cleanup discussed in Section 2.3.1 is more rigorous than the ASME method (which involves only sequential immersions in hexane, oven drying, and 1 hr Soxhlet extraction immediately prior to use).

3.0 Glassware, Solvent, and Adsorbent Screening

3.1 Glassware Contamination Check

After glassware has been thoroughly cleaned, an appropriate number (depending on size of project) of representative pieces of glassware from each apparatus type, i.e., Soxhlets, cleanup columns, etc., will be screened before a project is initiated. The apparatus is to be screened with the appropriate solvent, i.e., the solvent which is stated in the protocol for the analysis step utilizing the particular piece of glassware and taking into account the compounds of interest. The glassware screen will be subjected to the same analytical process as are the field samples, the extent of which depends on the process step where the glassware is used. For example, a Soxhlet screen involves charging the Soxhlet with the appropriate volume of solvent, extracting for at least 16 hr, concentrating in a rotoevaporator and under N_2 stream, and running the extract over the appropriate cleanup column(s). A separatory funnel screen involves extracting 1 L of Milli-Q water (or an appropriate volume depending on the separatory funnel size) with the appropriate solvent, concentrating in a rotoevaporator and under N_2 stream, and running the extract over the appropriate cleanup column(s). All glassware screens are to be concentrated into tridecane and analyzed by HRGC/MS.

3.2 Solvent Contamination Check

Solvents used in field sampling and lab preparation of samples will be screened prior to project initiation. An effort will be made to purchase enough of the same lot number of a solvent to cover an entire project. In any event, every lot number of a solvent used on a project will be screened. Solvents to be screened include the hexane and acetone to be used for field sampling as well as the toluene, hexane, methylene chloride, and tridecane used in sample preparation. In the case where a project calls for analysis for PCDD/PCDF, the toluene used for the Soxhlet screen may also represent the toluene solvent screen. In the case where the project requires a separatory funnel or continuous liquid-liquid extraction the separatory funnel and continuous liquid-liquid extraction screen may also represent the methylene chloride (300 mL) and hexane (300 mL) solvent screen. Acetone (150 mL) and hexane (150 mL) to be used in the field are concentrated in a rotoevaporator and are then subjected to the same cleanup and concentration procedures as are field samples. All solvent screens are to be worked up and concentrated into tridecane and analyzed by HRGC/MS.

3.3 XAD-2 Contamination Check

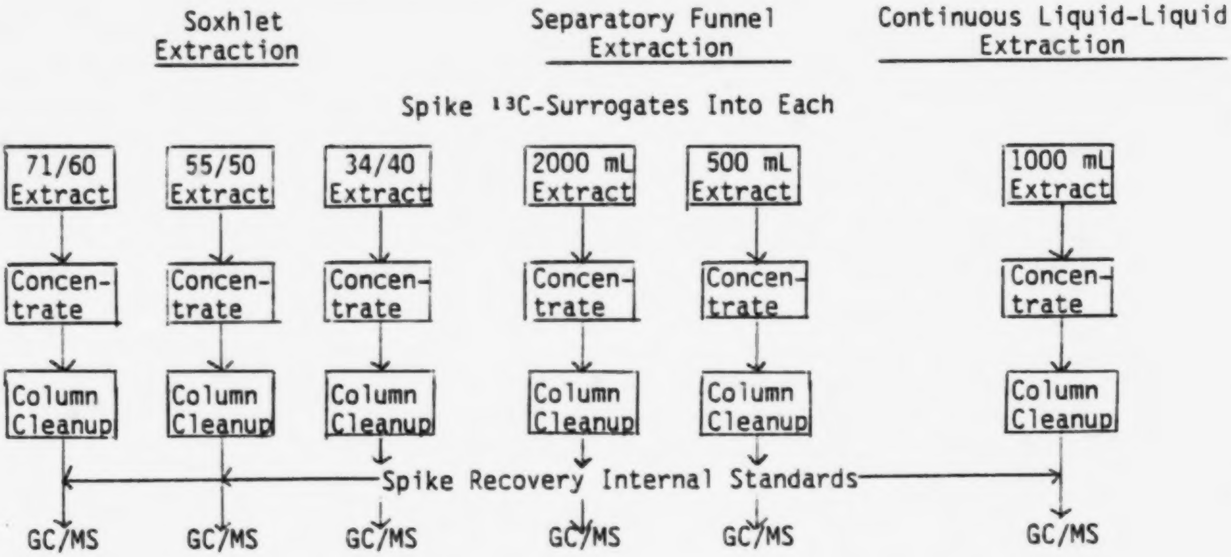
An aliquot of 65 g of XAD-2 resin should be subjected to the same extraction, concentration, cleanup, and analytical procedures as is to be applied to field samples. The criteria for acceptable XAD-2 quality depends upon the detection limit established for the field sampling data and the analytical method for the project. Specifically, any XAD-2 which yields a background signal greater than or equal to one-half the MDL (minimum detectable limit) for the analyte(s) should be recleaned.

3.4 Adsorbent Contamination Check

An aliquot of 5 g of each adsorbent used in the analytical procedures (the acidified silica gel may also represent the unmodified silica gel) will be screened prior to project initiation. The adsorbents will be Soxhlet extracted for 3 hr in the appropriate solvent, i.e., the solvent which is stated in the protocol for the analysis step utilizing the particular adsorbent. The extracts are subjected to the same concentration and cleanup procedures as are field samples. All adsorbent screens are to be concentrated into tridecane and analyzed by HRGC/MS as noted in Section 3.1.

3.5 Summary of Laboratory Screens

The laboratory screens are summarized below:



The screens generated using this scheme along with the screens of adsorbents exceeds the requirements of the ASME protocol.

3.6 Summary of Other QA Requirements

3.6.1 One QA blank per samples set (set = 20).

3.6.2 One QA split and/or spike per sample set (set = 20).

3.6.3 Field blank is as required by client or MRI field crew.

3.6.4 Trip blank is as required by client or MRI field crew.

3.7 Surrogate Spiking Requirements for all Blanks

All laboratory screens, QA field and trip blanks shall be spiked with the appropriate $^{13}C_{12}$ method and recovery internal standards.

4.0 Waste Sample Homogenization and Aliquoting

It is extremely crucial that all waste feed samples are homogenized as completely as possible prior to aliquoting, spiking, and analysis. Since the waste feed samples will, in most cases, be liquid, the worst case scenario will be homogenizing a multi-phasic liquid. However, some solids may also be associated with the samples which must be broken up and dispersed as well as possible throughout the sample.

The number of sample aliquots required for the different types of analyses and replicates must be determined prior to sample homogenization so that all of the correct size aliquots may be removed immediately following sample homogenization.

4.1 Waste Sample Observation

The waste sample should first be carefully observed in order to determine the expected degree of difficulty in homogenizing the samples. One of several alternative homogenization techniques will be used.

4.2 Sample Homogenization

4.2.1 Liquid Wastes

4.2.1.1 Manual homogenization: It is expected that most samples will be able to be homogenized using vigorous shaking of the sample container followed by stirring with a stirring rod.

4.2.1.2 Mechanical homogenization: Waste samples which cannot be readily homogenized using manual mixing techniques will be homogenized using a mechanical mixer.

4.2.2 Solid Wastes

4.2.2.1 Waste feed: Solid waste samples from refuse incinerator burns often include a variety of substrates which cannot be easily homogenized with paper, plastic, wood, and other household refuse, i.e., large metal objects.

Samples will be weighed and then segregated to remove large hard objects, such as metal pipe, that cannot be ground up. These objects will be weighed to determine what fraction of the sample weight they represent. The remaining sample will then be ground in a shredder and manually mixed, although the shredder does provide some sample mixing. Grind until sample will pass through a 1-mm standard sieve. One-gallon wide-mouth bottles will then be filled with the ground and mixed samples to provide samples for the analysis. Shredding and compositing this type solid waste sample is generally performed by the field sampling crew.

4.2.2.2 Bottom ash: The entire sample is to be used. The contents of the sample container is transferred to a Soxhlet extractor and extracted as in Section 6.0.

4.3 Sample Aliquoting

Immediately following sample homogenization, the appropriate size, e.g., volume or mass, and number of replicate samples are removed from the mixed sample.

5.0 Sample Spiking

5.1 General Spiking Procedure

5.1.1 Samples will be spiked with method internal standards (MIS) prior to extraction, and recovery internal standards (RIS) prior to GC/MS analysis.

5.1.2 All spiking solutions will be prepared and maintained in vials that provide minimum headspace and accurate volume assessment.

5.1.3 All spiking solutions will be sonicated prior to use to ensure complete mixing.

5.1.4 All spiking solution levels will be marked using a diamond-tipped etching pen. The marked level will be checked prior to use.

5.1.5 All syringes used for the spiking of samples will be traceable. Syringes are numbered and a record of their use will be maintained by spiking personnel.

5.2 Method Internal Standard Spiking

5.2.1 XAD-2 Resin Spiking

XAD-2 resin will be spiked by injecting the appropriate amount of method internal standards (surrogates) into the center of the resin. The syringe needle will be moved about somewhat so that all of the analytes are not deposited on one spot of the resin.

5.2.2 Particulate Filter Spiking

The particulate filter will be spiked by adding the appropriate amount of the method internal standards (surrogates) to the filter which has already been placed in the Soxhlet apparatus. The solvent will be distributed over most of the surface of the filter and care will be taken not to let any of the solvent drip through the filter or contact another surface which would cause loss of the spiked analytes.

5.2.3 Front 1/2-/-Back 1/2 (Organic Rinses)

These samples will be spiked by adding the appropriate amount of the method internal standards (surrogates) to the aliquots of the solvent used to recover the MM5 train compounds. The sample is then gently swirled to affect mixing.

5.3 Recovery Internal Standards Spikings

Recovery internal standards will be spiked into samples and the resulting solution will be sonicated prior to analysis.

6.0 Extraction of Field Samples for Semivolatile Organic Compounds

6.1 Sample Train and Aqueous Sample Extraction

The components of the Modified Method 5 (MM5) sampling train that need to be extracted are the:

- Particulate filter/probe rinse residue
- XAD-2 resin
- Front 1/2-/-Back 1/2

6.1.1 Extraction of Particulate Filters/Front Half Rinse Residues

6.1.1.1 Setup a Ʒ 55/50 Soxhlet extraction apparatus with 325 mL of toluene in a 500 mL round-bottom flask along with several Berl saddle or silicon carbide boiling chips. Record identification numbers of glassware and lot numbers of solvent in lab record book (LRB). Collect glassware rinses and archive.

6.1.1.2 Put preextracted regular glass wool in the bottom of the Soxhlet extractor to prevent particulates from entering the cycle arm. Carefully fold filter in half. Do not allow any particulate material to be lost from the filter.

6.1.1.3 Add the sample to the Soxhlet extractor with tweezers being careful not to lose any sample. Rinse the sample container with three 5-mL portions of extraction solvent.

6.1.1.4 Filter the front half rinse using a powder funnel and a clean filter from the same lot as used in the field. Collect the rinse in a clean, rinsed bottle.

6.1.1.5 Add the residue filter to the Soxhlet extractor with the particulate filter.

6.1.1.6 Spike the sample with the appropriate amount of the method internal standard (surrogates) spiking solution.

6.1.1.7 Soxhlet extract the filter/front half rinse residue sample for 16 to 22 hr at a cycle rate of 3 cycles/hr.

6.1.1.8 After extraction drain the solvent extract into the receiving flask and save for combining with other component extracts as required by the project contract.

6.1.1.9 Proceed with concentration step (Section 7.0).

6.1.2 Extraction of XAD-2 Resin

The MM5 sampling train contains a 65-g XAD-2 resin cartridge. This trap may be extremely wet because stack gas condensate passes through it during sampling.

6.1.2.1 Set up a ₷ 61/60 Soxhlet extractor with a ₷ 29/42 joint attached to a 1,000-mL round-bottom flask containing 600 mL of the appropriate solvent and several Berl saddle boiling chips or silicon carbide boiling chips. Record the identification numbers of the glassware and the lot numbers of the solvent in the LRB and collect the glassware rinses and archive.

6.1.2.2 Add the ~ 65 g of XAD-2 resin from each collection cartridge to the Soxhlet extractor. Use preextracted regular glass wool to hold the XAD-2 resin in the Soxhlet extractor. Soxhlet extractors should not be filled more than one-half full with resin.

6.1.2.3 Spike the XAD-2 resin with an appropriate amount of the method internal standard (surrogate) spiking solution.

6.1.2.4 Extract the resin with toluene for 16 to 22 hr at a cycle rate of 3 cycles/hr.

6.1.2.5 If the extract in the round bottom flask develops an aqueous layer, remove the water layer.

6.1.2.5.1 Transfer the extract quantitatively to a 2000-mL separatory funnel.

6.1.2.5.2 Add 200 mL of Milli-Q water.

6.1.2.5.3 Drain the toluene layer through a powder funnel 2/3 filled with anhydrous sodium sulfate into a clean round-bottom flask.

6.1.2.5.4 Add 60 mL of toluene to the water in the separatory funnel.

6.1.2.5.5 Extract the water layer by shaking vigorously for 2 min with occasional venting.

6.1.2.5.6 Repeat step 6.1.2.5.3 combining toluene extracts. Discard water layer.

6.1.2.6 Save extract for combining with other components if required by project contract or proceed with concentration step (Section 7.0).

6.1.3 Separatory Funnel Extraction of Front 1/2 and Back 1/2 Rinses (Organic Rinses)

6.1.3.1 Record the glassware identification numbers in the LRB.

6.1.3.2 Rinse the separatory funnel with toluene and archive for contamination check if required.

6.1.3.3 Mark the sample level on the sample container and pour the entire sample into the separatory funnel. Save sample container until volumes are verified by Field Programs Department.

6.1.3.4 Rinse the sample bottle by adding 20 mL of toluene to the bottle and transferring rinse to the separatory funnel.

6.1.3.5 Add the appropriate amount of the method internal standard spiking solution (surrogates) to the sample and gently swirl to affect mixing.

6.1.3.6 Add 200 mL of Milli-Q water to the separatory funnel. Vigorously shake for 2 min with occasional venting to release excess pressure.

6.1.3.7 Allow the organic layer to separate from the water phase. Drain the toluene layer through a powder funnel two-thirds filled with anhydrous sodium sulfate into a clean round-bottom flask.

6.1.3.8 Add 60 mL of clean toluene to the water in the separatory funnel. Vigorously shake and allow phases to separate. Combine toluene fractions; discard water.

6.1.3.9 Proceed with concentrations steps (Section 7.0).

6.1.4 Separatory Funnel Extraction of Aqueous Samples

6.1.4.1 Record the glassware identification numbers in the LRB.

6.1.4.2 Rinse the separatory funnel with the appropriate extraction solvent and archive for contamination check if required.

6.1.4.3 Mark the sample level on the sample container and transfer the entire sample into the separatory funnel. Save the sample container until volumes are verified by Field Programs Department.

6.1.4.4 Add the appropriate amount of the method standard spiking solution (surrogates).

6.1.4.5 Rinse the sample bottle by adding 60 mL of the appropriate extraction solvent to the sample bottle, cap, and shake for 30 s to rinse the walls of the bottle.

6.1.4.6 Transfer the solvent to the separatory funnel and extract the sample by vigorously shaking the funnel for 2 min with an occasional venting to release pressure.

6.1.4.7 All the organic layer to separate from the water layer. Drain the organic layer through a fluted glass funnel packed with a wad of preextracted silanized glass wool and 20 g of anhydrous sodium sulfate into a clean round-bottom flask.

6.1.4.8 Extract the water two more times as in steps 6.1.4.5-6.1.4.7.

6.1.4.9 Combine organic layers; discard water after third extraction.

6.1.4.10 Proceed with concentration steps (Section 7.0).

6.2 Deviations from ASME 1984 Draft Protocol

6.2.1 As outlined in Sections 6.1.1.2 and 6.1.2.2, glass wool will be used to hold the sample in place during the Soxhlet extraction. Therefore, the method specified in ASME involving preextraction of silica gel, glass wool, and an extraction thimble will not be used. The glass wool used will be previously extracted as outlined in Section 2.3.1.

6.2.2 The back-extraction with water in Sections 6.1.2.5 and 6.1.3 is not specified in ASME. This step is necessary to remove entrained water from the toluene extracts to prevent complications during concentration which could cause loss of analytes.

6.2.3 Section 6.1.3 deviates from ASME protocol which calls for concentration by nitrogen followed by Soxhlet extraction of the residues with toluene. The ASME protocol neglects the possibility of complications caused by the presence of entrained water by concentrating the organic fractions to near dryness. The presence of small quantities of entrained water may cause loss of analytes. MRI, therefore, will back-extract organic front 1/2 and back 1/2 rinses with water as in Section 6.1.3.

6.2.4 The extraction in Section 6.1.4 deviates from ASME protocol by using separatory funnel instead of a screw-capped bottle.

7.0 Concentration and Cleanup for Semivolatile Organic Compounds

Each of the sample extracts from the various extraction procedures will be concentrated prior to column cleanup and GC/MS analysis. Initial concentration is by rotary evaporation followed (Section 7.1) by nitrogen evaporation (Section 7.2).

7.1 Rotary Evaporation

7.1.1 A sample to be concentrated using a rotary evaporation apparatus is placed in a standard $ 22/40 500 mL round bottom flask. The flask should be no more than 3/4 full.

7.1.2 The apparatus is prepared for use.

7.1.2.1 Two hundred fifty milliliters of clean solvent (same as sample solvent) is placed in a clean round-bottom flask.

7.1.2.2 The vacuum is started (turn on water aspirator or vacuum pump). The vacuum line must have an in-line trap to prevent moisture from backing into the apparatus due to pressure or flow variations, and to prevent sample solvent from contaminating the vacuum source.

7.1.2.3 Turn on the water bath. Heat to the temperature necessary to evaporate the solvent used.

7.1.2.4 Turn on the condenser water.

7.1.2.5 Place the round bottom with clean solvent on the apparatus. Clamp the round bottom to the apparatus.

7.1.2.6 Close the pressure release valve and make sure that vacuum is achieved.

7.1.2.7 Turn on the motor and start the flask rotating slowly.

7.1.2.8 Lower the apparatus so that the solvent flask is in the water bath.

7.1.2.9 When the solvent begins to collect in the collection reservoir, adjust the water bath temperature so that the solvent is condensing at a rate of about 5 mL/min.

7.1.2.10 Allow the clean solvent flask to evaporate to dryness.

7.1.2.11 Raise the apparatus out of the water bath.

7.1.2.12 Turn off the motor.

7.1.2.13 Grasp the flask and open the pressure relief valve to slowly release the vacuum.

7.1.2.14 Remove the flask from the apparatus. The apparatus is ready for use.

7.1.3 Place the round bottom with the sample on the apparatus. Proceed as in steps 7.1.2.6 through 7.1.2.14. If a water layer appears during concenration, immediately stop concentration and separate water as in step 6.1.3. Note in LRB.

7.1.4 Do not allow samples to evaporate completely. Stop when the sample is reduced to 1 to 2 mL. If further concentration of the sample is necessary, nitrogen concentration (Section 7.2) will be performed.

7.1.5 The apparatus must be thoroughly rinsed with clean solvent in between samples to prevent cross-contamination. Archive glassware rinses.

7.2 Nitrogen Evaporation (N-EVAP)

7.2.1 Transfer the final extract from the rotoevaporator to a premarked vial and use a gentle stream of nitrogen to concentrate the extract to the proper volume. Since the volume of the final extract may be more than the volume of the vial to be used, several transfers of the sample may be necessary.

7.2.2 When all of the extract has been transferred to the vial, the flask will be rinsed (3x) with the appropriate solvent, and the rinses added to the vial.

7.2.3 Solvent exchange - Add 25 µL of tridecane to sample. Concentrate extract to 25 µL level and immediately add hexane (1 mL).

7.2.4 Concentrate the sample extract to the proper volume.

7.3 Cleanup of PCDD/PCDF Extracts

Injection of unpurified sample extracts into a gas chromatograph can cause extraneous peaks, deterioration of peak resolution and column efficiency, loss of detector sensitivity, and shortened lifetimes of expensive columns. The following technique is used to purify extracts to be analyzed for PCDD/PCDFs.

7.3.1 Assemble two 20 mm OD x 230 cm tapered columns and archive glassware rinses.

7.3.2 Put a small plug of preextracted silanized glass wool in the bottom of both columns.

7.3.3 Wet-pack the top column by filling the column to the bottom of the reservoir bulb with hexane. Pack the column with approximately 1 g of preextracted silica gel followed by approximately 4 g of 40% w/w acidified silica gel.

7.3.4 Elute and discard enough hexane to bring the solvent level to the top of the column packing.

7.3.5 Wet-pack the bottom column filling the column to the bottom of the reservoir bulb with hexane. Pack the column with approximately 6 g of preextracted acid alumina followed by an approximate 1 cm layer of preextracted Na_2SO_4. Elute and discard enough hexane to bring the solvent level about 1 cm above the Na_2SO_4 layer.

Preelute the acid alumina column with 50 mL of 50% $MeCl_2$/hexane and collect eluate in a precleaned 4 oz Rx bottle. Archive the preeluate then elute the column with 100 mL of hexane, discarding the hexane. Leave about 1 cm of hexane above the Na_2SO_4 layer.

7.3.6 Set up the columns such that the silica gel column will elute directly onto the acid alumina column without any splattering or loss of sample.

7.3.7 The sample to be applied to the top column should be in approximately 1 mL hexane. Apply the sample with a hexane-rinsed pasteur pipet, taking care not to disturb the column packing. Elute enough hexane from the top column to bring the sample level to the top of the column packing. Rinse the sample vial (3x) with 0.6-1 mL hexane and apply to the column. Elute enough hexane to bring the rinse level to the top of the packing.

7.3.8 Elute the top column with 45 mL hexane. To avoid disturbing the column packing, apply approximately 2 mL of the hexane with a pasteur pipet, add the remainder of the hexane and elute into bottom column.

7.3.9 Remove the top column and dispose of dry column packing in a hazardous waste container. Rinse column glassware with bulk acetone. Soak in soapy water (overnight, if possible) and clean according to glassware cleanup procedure.

7.3.10 Elute the bottom column with 20 mL hexane to just below the Na_2SO_4 layer, collecting the eluate in the same 4 oz Rx bottle from step 7.3.8. Mark the solvent level, seal with Teflon®-lined cap and Teflon tape and archive.

7.3.11 Elute the bottom column with 20 mL of 20% methylene chloride/hexane (v/v) and collect the eluate in a hexane-rinsed 6 dram vial with a Teflon®-lined cap. To collect the entire eluate, apply slight back pressure with a pipet bulb. This solvent fraction is to be analyzed for dioxins and furans--mark sample volume, seal with Teflon® tape, and refrigerate until sample can be worked up further.

7.3.12 Elute the bottom column with 20 mL of 50% methylene chloride/hexane (v/v) and collect the eluate in a hexane-rinsed 6 dram vial with a Teflon®-lined cap. Mark the solvent level, seal with Teflon® tape, and archive.

7.3.13 Dispose of the bottom column packing. Rinse column glassware with acetone and clean according to the glassware cleanup procedure.

7.3.14 Concentrate the 20% $MeCl_2$/hexane fraction under N_2 stream to a 2-3 mL volume. Transfer the sample to a hexane-rinsed reacti-vial using a hexane-rinsed pasteur pipet. Rinse the 6 dram vial (3x) with 1 mL hexane and add the rinses to the sample. Add the appropriate volume of tridecane and concentrate the sample under N_2 stream to the final volume of tridecane (typically 25 - L).

7.3.15 At this point, the sample will be analyzed for PCDD/PCDF by GC/MS (Section 9.0).

7.3.16 If GC/MS indicates that the sample is too concentrated, the appropriate dilutions will be performed. If the sample is found to be grossly contaminated, further cleanup procedures will be carried out.

7.4 Deviations from ASME 1984 Draft Protocol

7.4.1 The ASME method concentrates samples only by nitrogen evaporation. The MRI method of rotoevaporation and nitrogen concentration (Sections 7.1 and 7.2) is less time consuming and also lessens sample handling (thus decreasing the likelihood of laboratory errors).

7.4.2 The sample cleanup columns used (Section 7.3) are different from those specified by the ASME method. The method used by MRI is outlined in the EPA Region VII September 1983 protocol "Determination of 2,3,7,8-TCDD in Soil and Sediment." In accordance with best professional judgment and good analytical techniques, a third and/or fourth column, per the ASME protocol, or a performance equivalent will be utilized as necessary.

8.0 Preparation and Use of Calibration Standards, Method Internal Standards (Surrogates), and Recovery Internal Standards

8.1 General Procedures for Standard Preparation

8.1.1 Preparation and/or acquisition of accurate calibration standards, method internal standards, and recovery internal standards are extremely crucial in achieving accurate quantification of sample components. It is also important that the standards be prepared in the correct solvent, since the standards are used for both direct analysis and for spiking.

8.1.2 As many as possible of the pure compounds and diluted calibration standards will be obtained from the EPA Quality Assurance Branch, EMSL/CI, and the Reference Standards Repository EPA/RTP or commercial neat compounds.

8.1.3 The source, lot number, and purity of all standards will be recorded in LRB. All standard solutions will contain the following information on its respective vial:

- Concentration of standard
- Date of preparation
- Solvent used
- Project number or sample I.D.
- Initials of person preparing solution
- Expiration date of solution

8.1.4 Stock solutions of the various calibration isomers and mixtures should be prepared in a glovebox. All standards will be weighed on an analytical balance.

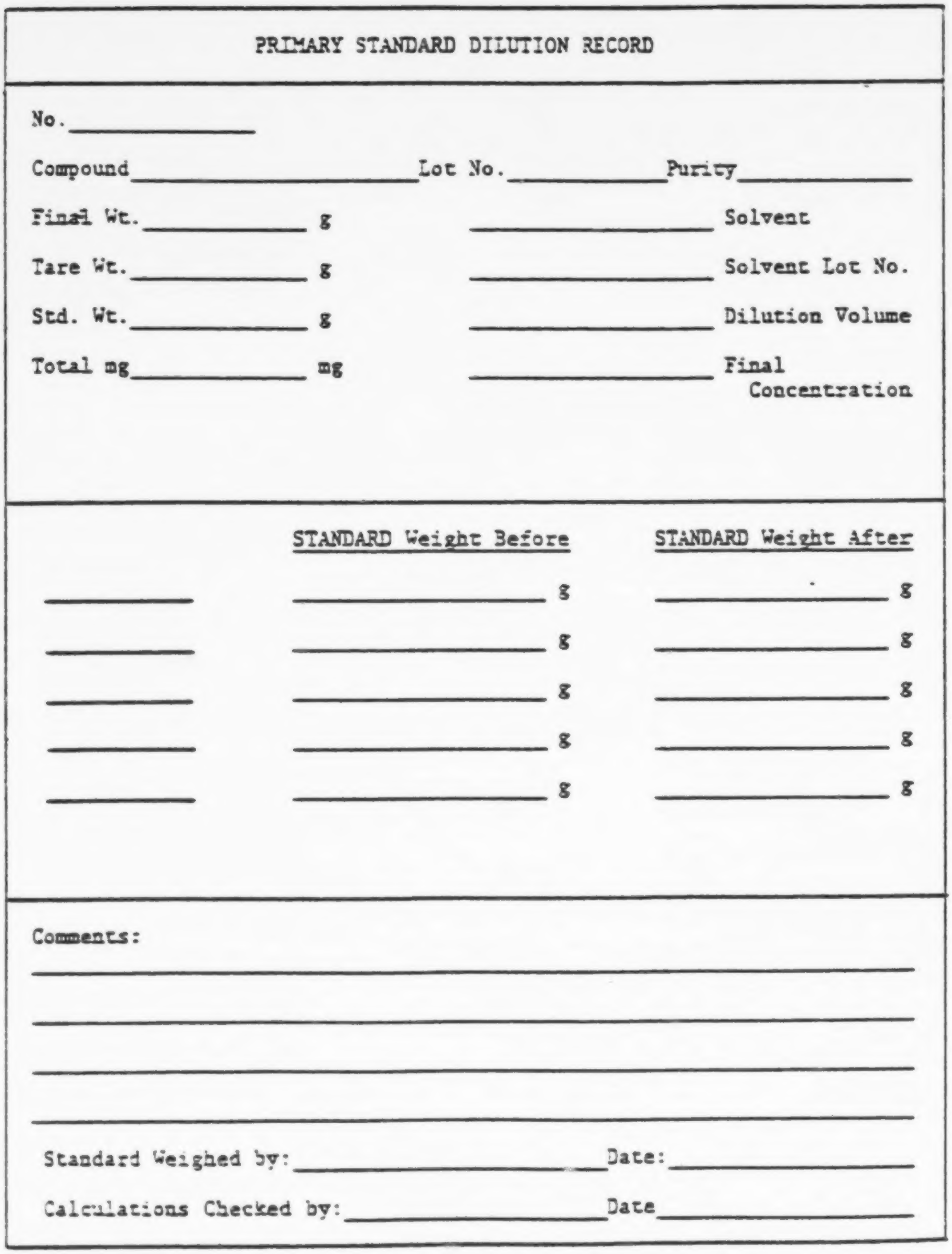
8.1.4.1 Calibrate the analytical balance prior to weighing standards by using weights which are in the range of the standard weighings (see Figure 8-1). Preparation of stock standards from primary standards will be recorded on this format. A copy of this record will be kept on file.

8.1.4.2 The various standard solutions will be stored at 4°C in a Teflon®-lined conical screw-cap vial with the solution level marked on the vial with a diamond tipped etching pen.

8.1.4.3 Dilutions of the working standard solutions will be prepared from aliquots of the stock standards (see Figure 8-2). Preparation of final working solutions will be recorded and dilution records maintained by using this format. A copy is to be kept on file.

8.2 Standards Used in the Analysis of PCDD/PCDF

8.2.1 Dioxin/furan working calibration standard, method internal standard (surrogates) and recovery internal standard will be:



PRIMARY STANDARD DILUTION RECORD

No.______________

Compound____________________ Lot No.__________ Purity____________

Final Wt.____________ g __________________ Solvent

Tare Wt.____________ g __________________ Solvent Lot No.

Std. Wt.____________ g __________________ Dilution Volume

Total mg____________ mg __________________ Final Concentration

	STANDARD Weight Before	STANDARD Weight After
________	____________ g	____________ g
________	____________ g	____________ g
________	____________ g	____________ g
________	____________ g	____________ g
________	____________ g	____________ g

Comments:

____

____

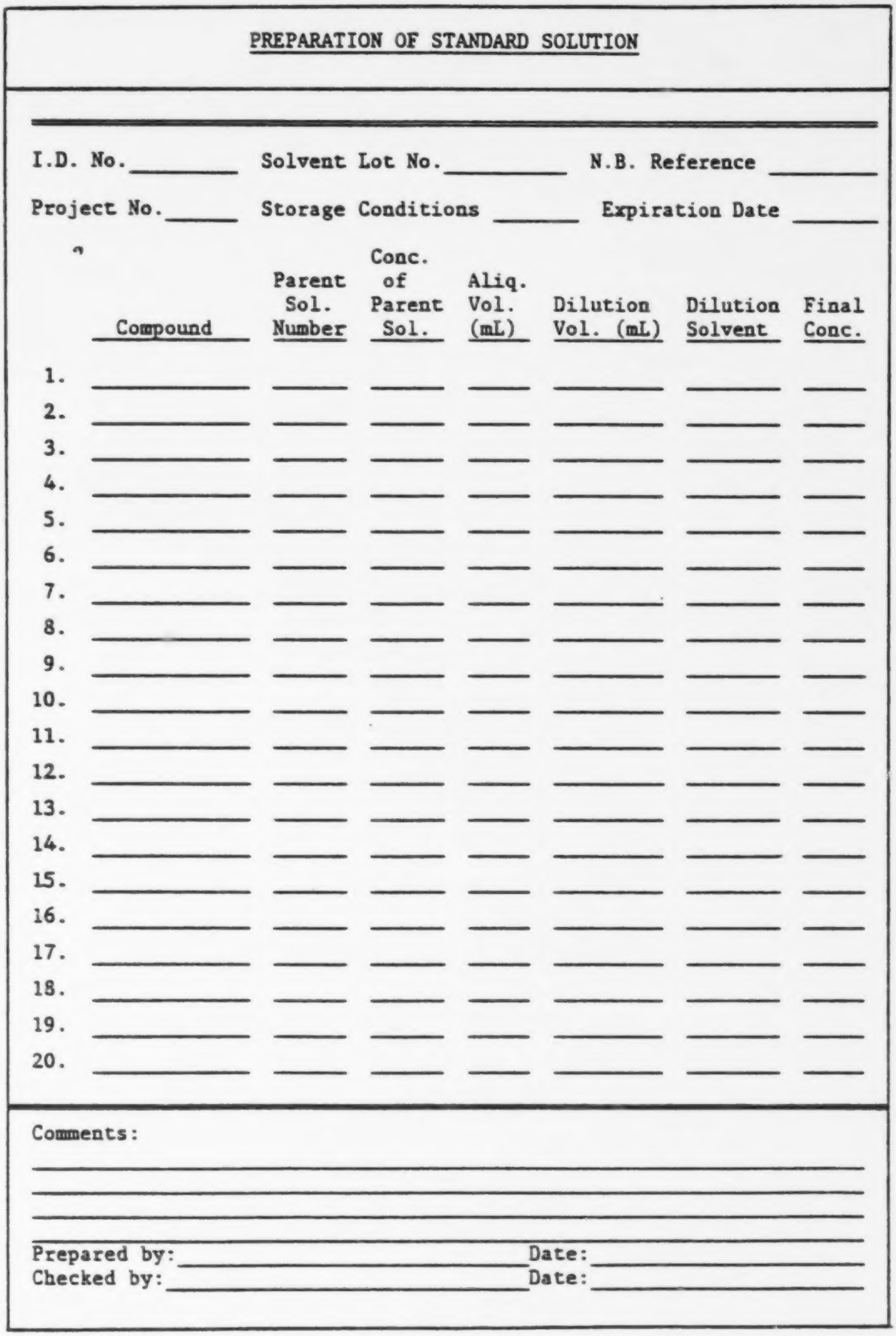
____

____

Standard Weighed by:____________________ Date:______________

Calculations Checked by:__________________ Date______________

Figure 8-1 - Primary Standard Dilution Record



PREPARATION OF STANDARD SOLUTION

I.D. No.________ Solvent Lot No.__________ N.B. Reference _________

Project No.______ Storage Conditions _______ Expiration Date _______

	Compound	Parent Sol. Number	Conc. of Parent Sol.	Aliq. Vol. (mL)	Dilution Vol. (mL)	Dilution Solvent	Final Conc.
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							
11.							
12.							
13.							
14.							
15.							
16.							
17.							
18.							
19.							
20.							

Comments:

Prepared by:______________________________ Date:______________________

Checked by:_______________________________ Date:______________________

Figure 8-2 - Preparation of Final Working Standard Solutions

- Dissolved in anisole, isooctane, or tridecane.
- Prepared in quantities to last the entire project based on the number of samples to be analyzed.
- Replaced after 6 months or sooner if comparison with quality control check samples indicates compound degradation or concentration change.
- Prepared in duplicate.

8.2.2 Recovery Internal Standards

A solution containing the two recovery internal standards, $^{13}C_{12}$-1,2,3,4-TCDD and $^{13}C_{12}$-1,2,3,7,8,9-HxCDD, will be prepared. This solution will be used to spike samples prior to GC/MS analysis, and to prepare working calibration standards.

8.2.3 Method Internal Standards (MIS)

A concentrated solution containing the analytes listed in Table 8-1 will be prepared. This solution will be diluted to prepare a surrogate solution to be spiked into samples prior to extraction, and to prepare working calibration standards.

8.2.4 Native Analyte Standards

A concentrated solution containing the analytes listed in Table 8-1 will be prepared. This solution will be used to prepare working calibration standards.

8.2.5 Working Calibration Standards

Prepared in concentrations listed in Table 8-1 from solutions of RIS, MIS, and native analyte standards. Actual concentrations may vary due to preparation.

8.3 Deviations from ASME 1984 Draft Protocol

8.3.1 The series of PCDD/PCDF congeners (both native and labeled) used by MRI in preparing calibration standards, method internal standards, and recovery internal standards, varies somewhat from the standard congeners prescribed by the ASME method. However, MRI uses a more extensive series of congeners which should more accurately reflect the PCDD/PCDF responses in samples. (For example, MRI uses 9 method internal standards and 2 recovery internal standards while ASME calls for 7 method internal standards and 1 recovery internal standard.)

8.3.2 ASME protocol specifies storing standard solutions in volumetric flasks. MRI will use conical vials with minimum headspace to easily monitor standard integrity.

TABLE 8-1

CONCENTRATIONS OF CONGENERS IN TCDD/TCDF-OCDD/OCDF CALIBRATION STANDARDS (ng/mL)

Compound	Calibration Solutions (ng/mL)			
	DF5 (5-25)	DF10 (10-50)	DF100 (100-500)	DF500 (500-2,500)
Native (Calibration Standard)				
2,3,7,8-TCDF*	4.98(0.1)	9.96(0.2)	99.6(2)	498(10)
2,3,7,8-TCDD*	4.96(0.1)	9.92(0.2)	99.2(2)	496(10)
1,2,3,7,8-PeCDF*	5.01(0.1)	10.0(0.2)	100(2)	501(10)
2,3,4,7,8-PeCDF	4.96(0.1)	9.92(0.2)	99.2(2)	496(10)
1,2,3,7,8-PeCDD*	5.06(0.1)	10.1(0.2)	101(2)	506(10)
1,2,3,4,7,8-HxCDF	12.3(0.063)	24.6(0.125)	246(1.25)	1,235(6.3)
1,2,3,6,7,8-HxCDF	12.3(0.063)	24.6(0.125)	246(1.25)	1,233(6.3)
2,3,4,6,7,8-HxCDF*	12.6(0.063)	25.2(0.125)	252(1.25)	1,256(6.3)
1,2,3,7,8,9-HxCDF	12.3(0.063)	24.6(0.125)	246(1.25)	1,230(6.3)
1,2,3,4,7,8-HxCDD	12.2(0.063)	24.4(0.125)	244(1.25)	1,219(6.3)
1,2,3,6,7,8-HxCDD	12.7(0.063)	25.4(0.125)	254(1.25)	1,268(6.3)
1,2,3,7,8,9-HxCDD*	12.7(0.063)	25.4(0.125)	254(1.25)	1,268(6.3)
1,2,3,4,6,7,8-HpCDF*	12.5(0.063)	24.9(0.125)	249(1.25)	1,246(6.3)
1,2,3,4,7,8,9-HpCDF	12.5(0.063)	25.0(0.125)	250(1.25)	1,250(6.3)
1,2,3,4,6,7,8-HpCDD*	12.4(0.063)	24.9(0.125)	249(1.25)	1,244(6.3)
OCDF*	24.6(0.05)	49.2(0.1)	492(1)	2,459(10)
OCDD*	24.4(0.05)	48.8(0.1)	488(1)	2,442(10)
Stable Isotopes (Method Internal Standards)				
^{13}C-2,3,7,8-TCDF	50	50	50	50
^{13}C-2,3,7,8-TCDD	50	50	50	50
^{13}C-1,2,3,7,8-PeCDD	100	100	100	100
^{13}C-1,2,3,7,8-PeCDF	100	100	100	100
^{13}C-1,2,3,6,7,8-HxCDD	200	200	200	200
^{13}C-1,2,3,4,7,8-HxCDF	200	200	200	200
^{13}C-1,2,3,4,6,7,8-HpCDD	200	200	200	200
^{13}C-1,2,3,4,6,7,8-HpCDF	200	500	500	500
Recovery Internal Standards				
^{13}C-1,2,3,4-TCDD	94	94	94	94
^{13}C-1,2,3,7,8,9-HxCDD	200	200	200	200

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* = The isomer used to quantitate each total D/F.

() = The ratio of the concentration of the native calibration standard to the concentration of the stable-isotopically labeled method internal standard.

Note: Native calibration standards are listed by their retention time order.

9.0 GC/MS Analysis for PCDD/PCDF (ASME Method)

9.1 GC/MS Internal Quality Control

9.1.1 General QA/QC Requirements

9.1.1.1 Each mass spectrometer (MS) will be calibrated for mass scale if possible on a daily basis or if the MS has been drastically retuned or if the mass range to be scanned is changed. Perfluorokerosene (PFK) or perfluorotributylamine (FC-43) or any other accepted mass marker compound may be used to calibrate the mass scale through at least m/z 500. The calibration procedures specified by the manufacturer for each MS instrument will be employed.

9.1.1.1.1 For selected ion monitoring applications (SIM), mass calibration will be checked for each interval of $\leq$ 8 hr.

9.1.1.1.2 For magnetic sector mass spectrometers, a PFK ion near the midpoint m/z of the current sample mass scanning range will be monitored. The mass spectrometer will be calibrated if the magnet cannot be adjusted to bring the PFK ion being monitored into focus.

9.1.1.2 Analyze a complex standard mixture if needed to establish a GC temperature program.

9.1.1.3 Analyze a complex mixed standard to establish retention windows once per day or after a column change or after major shifts in elution time are observed.

9.1.1.4 Use native mixtures of TCDD and TCDF to show a valley of 20% or less for adjacent peaks.

9.1.1.5 Establish a three-point calibration curve for each type of analyte analysis. Set up the mass spectrometer scan rate such that at least five data points are acquired for each chromatographic peak.

9.1.1.6 Calculate relative response factors (RRF) for all method internal standards and calibration standards and determine variability using a standard library.

9.1.1.7 The project leader will evaluate the data and determine if the calibration curve requires additional analysis. In establishing the calibration curve, the relative response factor variability should be ± 20% for the native 2,3,7,8-substituted TCDD/TCDF and ± 30% for the native PCDD/PCDF, HxCDD/HxCDF, HpCDD/HpCDF, and OCDD/OCDF analytes.

9.1.1.8 If applicable, a QC sample instrument performance submitted by the QA office must be analyzed prior to analysis of sample extracts.

9.1.1.9 There will be at least one method blank per $\leq$ 20 samples.

9.1.1.10 There will be at least one QA native spike sample per ≤ 20 samples. Results must be within ± 50% of known concentration.

9.1.1.11 There will be at least one set of duplicate samples per ≤ 20 sample set (not applicable to MM5 train samples).

9.1.1.12 Sources of all calibration and performance standards used in the analyses and the purity of these materials must be specified in the data report.

9.1.2 Daily QA/QC Requirements

9.1.2.1 Analyze a standard to verify GC column and MS performance; once prior to analyzing samples, once upon completion of 8 hr and/or at the end of the work day.

9.1.2.2 Calculate daily standard relative response factors using a standard library. Verify the variability with respect to the mean response factors established by the calibration curve. These relative response factors will reflect the mean RRF obtained from the three-point calibration curve along with the daily standards. If variability is greater than the appropriate range (see Section 9.1.1.7), a new three-point calibration curve will be generated to conform with the appropriate variability criteria.

9.1.2.3 Verify the volume and dilution for each sample.

9.1.2.4 Analyze "blanks" at times sufficient to show lack of cross sample contamination. "Blank" is an injection and analysis of the neat solvent used in the sample and standard preparation.

9.1.2.5 Verify the instrument performance by showing that the area of the recovery internal standard does not vary ± 50% from sample run-to-run.

9.1.3 Daily Hard Copy Requirements Will Include:

9.1.3.1 Obtain a reconstructed ion current (RIC) with a header including the laboratory sample number and the proper dilution for each sample, blank, and standard analyzed (including all system contamination checks).

9.1.3.2 Obtain ion plots and quantitation lists for at least two characteristic ions of each calibration standard, method internal standard, recovery internal standard and analytes and/or quantitation lists for one characteristic ion. Each set of characteristic ion plots should be on one page titled with the appropriate analyte or compound. Alternate quantitation reporting procedures may be utilized as directed by the project leader.

9.1.3.3 Obtain a current relative response factor summary list of all of the standards analyzed.

9.1.3.4 Obtain a mass list and spectra used to calibrate each mass spectrometer for PFK or FC-43.

9.1.4 End of Project Requirements

9.1.4.1 Obtain a hard copy of a graph of relative response factor versus area for each calibration curve.

9.1.4.2 Obtain a hard copy of a graph of relative response factor versus concentration for each calibration curve.

9.1.4.3 Obtain a hard copy of a graph of relative response factor versus time of standard analysis for the entire project.

9.1.4.4 Obtain a xerox copy of each laboratory notebook page on which instrumental parameters and/or sample information was entered.

9.1.4.5 Obtain a hard copy of "PARA" for each sample and standard. "PARA" (an INCOS MSDS program) lists the MS instrument parameters, the GC operating temperature program, and the acquisition scan window parameters.

9.2 Gas Chromatograph/Mass Spectrometer/Data System (GC/MS/DS)

The instrument system used to analyze sample extracts for PCDD/ PCDF comprises a gas chromatograph (fitted for capillary columns) coupled directly or through an enrichment device to a mass spectrometer which is equipped with a computer based data system.

9.2.1 The gas chromatograph will operate using the parameters shown in Table 9-1 daily.

9.2.2 The mass spectrometer must be calibrated as outlined in Section 9.1.

9.2.3 The mass spectrometer must meet the minimum operating parameters shown in Table 9-2 daily. If all criteria are not met, the analyst must adjust conditions and repeat the test until all criteria are met.

9.3 GC/MS Analysis of Tetra-Octa CDD/CDF Standards and Samples

9.3.1 The analyst must establish a three-point calibration curve using the suggested concentrations of tetra-octa CDD/CDF standard compounds in Table 9-3 and the primary and secondary ions in Table 9-4.

9.3.2 Relative response factors (RRF) will be calculated using the primary and secondary ions of the calibration standards.

TABLE 9-1

OPERATING PARAMETERS FOR THE CAPILLARY COLUMN GAS CHROMATOGRAPHIC SYSTEM FOR ANALYSIS OF TETRA-OCTA CDD AND CDF

	Recommended Operating Parameters	
Parameter	Option A[a]	Option C[b]
Mass spectrometer	KRATOS MS-50	KRATOS MS-50
Gas chromatograph	Carlo Erba MFC 500	Carol Erba MFC 500
Column	30-60 m x 0.25 mm ID fused silica	60 m x 0.25 mm ID fused silica
Liquid phase	DB-5	DB-5
Liquid phase thickness	0.25 μm	0.25 μm
Carrier gas	Helium	Helium
Carrier gas velocity[c]	20-40 cm/s	20-40 cm/s
Injector[d]	"Grob" (splitless mode)	"Grob" (splitless mode)
Injector temperature	270°C	270°C
Injection volume	1-5 μL	1-5 μL
Initial column temperature[e]	200°C (4 min hold)	200° (2 min hold)
Column temperature program[f]	200-330°C at 5°C/min	200-220 (5°C/min) hold 16 min 220-235 (5°C/min) hold 7 min 235-330 (5°C/min)
Separator[g]	None	None
Transfer line temperature[h]	280-300°C	280-300°C
Peak width[i]	5-10 s	5-10 s

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[a] Operating parameters for analysis of total tetra-octa CDD/CDF.

[b] Operating parameters for simultaneous analysis of any 2,3,7,8-PCDD/PCDF and total tetra-octa CDD/CDF.

[c] Measured by injection of air or methane at 270°C oven temperature.

[d] Manufacturer's instructions should be followed regarding injection technique.

[e] Initial temperature equals boiling point of the solvent; in this instance, tridecane. the solvent is isooctane use 110°C.

[f] If the solvent is isooctane use: 110-200 (15°C/min), then 200-330 (5°C/min).

[g] Fused silica columns may be routed directly into the ion source to prevent separator discrimination and losses.

[h] High enough to elute any mono-tri standards but not high enough to degrade the columr routed through the transfer line.

[i] Chromatographic peak width at 10% height.

TABLE 9-2

OPERATING PARAMETERS FOR THE MAGNETIC SECTOR MASS SPECTROMETER SYSTEM FOR ANALYSIS OF MONO-OCTA CDD/CDF

Parameter	Option A Recommended Operating Parameters	Option B Recommended Operating Parameters
Mass spectrometer	KRATOS MS-50	Finnigan MAT 311A
Data system	INCOS Data System	INCOS Data System
Scan range[a]	202-472	202-472
Scan time[b]	0.5-1 sec	0.5-1 sec
Resolution	3000 or greater	1000

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[a] This is the scan range used in the SIM mode. See Table 9-4 for ions which are scanned.

[b] Five data points over a GC peak is a minimum.

[c] Filaments should be shut off during solvent elution to improve instrument stability and prolong filament life, especially if no solvent venting is used.

TABLE 9-3

CONCENTRATIONS OF CONGENERS IN TCDD/TCDF-OCDD/OCDF CALIBRATION STANDARDS (ng/mL)

	Calibration Solutions (ng/mL)			
Compound	DF5 (5-25)	DF10 (10-50)	DF100 (100-500)	DF500 (500-2,500)
Native (Calibration Standard)				
2,3,7,8-TCDF*	4.98(0.1)	9.96(0.2)	99.6(2)	498(10)
2,3,7,8-TCDD*	4.96(0.1)	9.92(0.2)	99.2(2)	496(10)
1,2,3,7,8-PeCDF*	5.01(0.1)	10.0(0.2)	100(2)	501(10)
2,3,4,7,8-PeCDF	4.96(0.1)	9.92(0.2)	99.2(2)	496(10)
1,2,3,7,8-PeCDD*	5.06(0.1)	10.1(0.2)	101(2)	506(10)
1,2,3,4,7,8-HxCDF	12.3(0.063)	24.6(0.125)	246(1.25)	1,235(6.3)
1,2,3,6,7,8-HxCDF	12.3(0.063)	24.6(0.125)	246(1.25)	1,233(6.3)
2,3,4,6,7,8-HxCDF*	12.6(0.063)	25.2(0.125)	252(1.25)	1,256(6.3)
1,2,3,7,8,9-HxCDF	12.3(0.063)	24.6(0.125)	246(1.25)	1,230(6.3)
1,2,3,4,7,8-HxCDD	12.2(0.063)	24.4(0.125)	244(1.25)	1,219(6.3)
1,2,3,6,7,8-HxCDD	12.7(0.063)	25.4(0.125)	254(1.25)	1,268(6.3)
1,2,3,7,8,9-HxCDD*	12.7(0.063)	25.4(0.125)	254(1.25)	1,268(6.3)
1,2,3,4,6,7,8-HpCDF*	12.5(0.063)	24.9(0.125)	249(1.25)	1,246(6.3)
1,2,3,4,7,8,9-HpCDF	12.5(0.063)	25.0(0.125)	250(1.25)	1,250(6.3)
1,2,3,4,6,7,8-HpCDD*	12.4(0.063)	24.9(0.125)	249(1.25)	1,244(6.3)
OCDF*	24.6(0.05)	49.2(0.1)	492(1)	2,459(10)
OCDD*	24.4(0.05)	48.8(0.1)	488(1)	2,442(10)
Stable Isotopes (Method Internal Standards)				
^{13}C-2,3,7,8-TCDF	50	50	50	50
^{13}C-2,3,7,8-TCDD	50	50	50	50
^{13}C-1,2,3,7,8-PeCDD	100	100	100	100
^{13}C-1,2,3,7,8-PeCDF	100	100	100	100
^{13}C-1,2,3,6,7,8-HxCDD	200	200	200	200
^{13}C-1,2,3,4,7,8-HxCDF	200	200	200	200
^{13}C-1,2,3,4,6,7,8-HpCDD	200	200	200	200
^{13}C-1,2,3,4,6,7,8-HpCDF	200	500	500	500
Recovery Internal Standards				
^{13}C-1,2,3,4-TCDD	94	94	94	94
^{13}C-1,2,3,7,8,9-HxCDD	200	200	200	200

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* = The isomer used to quantitate each total D/F.

() = The ratio of the concentration of the native calibration standard to the concentration of the stable-isotopically labeled method internal standard.

Note: Native calibration standards are listed by their retention time order.

TABLE 9-4

CHARACTERISTIC IONS FOR TETRA-OCTA CDD/CDF ANALYSIS

	Ion (Relative Intensity)#		
Compound	Primary $[M + 2]^+$	Secondary $[M]^+$	Ratio Range
Native (Calibration Standard)			
2,3,7,8-TCDF	305.8987 (100)	303.9016 (76)	.61-.91
2,3,7,8-TCDD	321.8936 (100)	319.8965 (76)	.61-.91
1,2,3,7,9-PeCDF	339.8597 (100)	337.8627 (61)	.49-.73
1,2,3,7,8-PeCDD	355.8546 (100)	353.8576 (61)	.49-.73
2,3,4,6,7,8-HxCDF	373.8207 (100)*	375.8178 (82)**	.66-.98
1,2,3,7,8,9--HxCDD	389.8156 (100)*	391.8127 (82)**	.66-.98
1,2,3,4,6,7,8-HpCDF	407.7817 (100)*	409.7787 (98)**	.78-1.18
1,2,3,4,6,7,8-HpCDD	423.7767 (100)*	425.7737 (99)**	.79-1.19
OCDF	443.7398 (100)	441.7428 (87)	.70-1.04
OCDD	459.7347 (100)	457.7377 (87)	.70-1.04
Stable Isotopes (Method Internal Standard			
^{13}C-2,3,7,8-TCDF	317.9395 (100)	315.9424 (76)	.61-.91
^{13}C-2,3,7,8-TCDD	333.9343 (100)	331.9373 (76)	.61-.91
^{13}C-1,2,3,7,8-PeCDF	351.9005 (100)	349.9035 (61)	.49-.73
^{13}C-1,2,3,7,8-PeCDD	367.8954 (100)	365.8984 (61)	.49-.73
^{13}C-1,2,3,4,7,8-HxCDF	385.8615 (100)	387.8586 (82)	.66-.98
^{13}C-1,2,3,6,7,8-HxCDD	401.8564 (100)*	403.8535 (82)**	.66-.98
^{13}C-1,2,3,4,6,7,8-HpCDF	419.8226 (100)	421.8196 (98)	.78-1.18
^{13}C-1,2,3,4,6,7,8-HpCDD	435.8175 (100)*	437.8145 (99)**	.79-1.19
^{13}C-OCDD	469.7785 (100)	471.7755 (87)	.70-1.04
Recovery Internal Standard			
^{13}C-1,2,3,4-TCDD	333.9343 (100)	331.9373 (76)	.61-.91
^{13}C-1,2,3,7,8,9-HxCDD	401.8564 (100)*	403.8535 (82)**	.66-.98

= Quantitation will be on the primary ion + secondary ion.
* = [M]+
** = [M + 2]

9.3.2.1 The RRF for TCDD and PeCDD is calculated using the following equation:

$$\text{Equation 1:} \qquad \text{RRF} = \frac{(A_S)(C_{IS})}{(A_{IS})(C_S)}$$

where A_S = SIM response for the calibration standard (TCDD or PeCDD); primary ion + secondary ion (320 + 322) or (354 + 356)

A_{IS} = SIM response for method internal standard ($^{13}C_{12}$-2,3,7,8-TCDD, or $^{13}C_{12}$-PeCDD); the $[M]^+$ ion (322), or (366)

C_{IS} = Concentration or amount of method internal standard ($^{13}C_{12}$-2,3,7,8-TCDD, or $^{13}C_{12}$-PeCDD)

C_S = Concentration or amount of the calibration standard (TCDD or PeCDD).

9.3.2.2 The RRF for TCDF and PeCDF is calculated using Equation No. 1 above:

where A_S = SIM response for the calibration standard (TCDF or PeCDF); primary ion + secondary ion (304 + 306) or (338 + 340)

A_{IS} = SIM response for method internal standard ($^{13}C_{12}$-2,3,7,8-TCDF, or $^{13}C_{12}$-PeCDF); the $[M]^+$ ion (316), or (350)

C_{IS} = Concentration or amount of method internal standard ($^{13}C_{12}$-2,3,7,8-TCDF, or $^{13}C_{12}$-PeCDF)

C_S = Concentration or amount of the calibration standard (TCDF or PeCDF).

9.3.2.3 The RRF for HxCDD, HpCDD, and OCDD is calculated using Equation No. 1:

where A_S = SIM response for the calibration standard (HxCDD, HpCDD, or OCDD); primary ion + secondary ion (320 + 392, 424 + 426, or 458 + 460)

A_{IS} = SIM response for method internal standard ($^{13}C_{12}$-HxCDD, $^{13}C_{12}$-HeCDD, or $^{13}C_{12}$-OCDD); the $[M]^+$ ion (402), (436), or (470)

C_{IS} = Concentration or amount of method internal standard ($^{13}C_{12}$-HxCDD, $^{13}C_{12}$-HpCDD or $^{13}C_{12}$-OCDD)

C_S = Concentration or amount of the calibration standard (HxCDD, HpCDD, or OCDD).

9.3.2.4 The RRF for HxCDF, HpCDF, and OCDF is calculated using Equation No. 1:

where A_S = SIM response for the calibration standard (HxCDF, HpCDF, or OCDF); primary ion + secondary ion (374 + 376, 408 + 410, or 442 + 444)

A_{IS} = SIM response for method internal standard ($^{13}C_{12}$-HxCDD, $^{13}C_{12}$-HpCDD, $^{13}C_{12}$-OCDD); the $[M]^+$ ion (402), (436), or (470)

C_{IS} = Concentration or amount of method internal standard ($^{13}C_{12}$-HxCDD, $^{13}C_{12}$-HpCDD, or $^{13}C_{12}$-OCDD)
C_S = Concentration or amount of the calibration standard (HxCDF, HpCDF, or OCDF).

9.3.2.5 The RRF for the method internal standard $^{13}C_{12}$-2,3,7,8-TCDF is calculated using the following equation:

$$\text{Equation 2:} \qquad RRF = \frac{(A_{IS})(C_{RS})}{(A_{RS})(C_{IS})}$$

where A_{IS} = SIM response for the method internal standard ($^{13}C_{12}$-2,3,7,8-TCDF); the $[M]^+$ ion (316)
A_{RS} = SIM response for the recovery internal standard ($^{13}C_{12}$-1,2,3,4-TCDD); the $[M]^+$ ion (332)
C_{RS} = Concentration or amount of the recovery internal standard ($^{13}C_{12}$-1,2,3,4-TCDD)
C_{IS} = Concentration or amount of the method internal standard ($^{13}C_{12}$-2,3,7,8-TCDF)

9.3.2.6 Use Equation No. 2 for calculating the RRF of $^{13}C_{12}$-2,3,7,8-TCDD, $^{13}C_{12}$-2,3,7,8-TCDF, $^{13}C_{12}$-PCDF, $^{13}C_{12}$-PCDD, $^{13}C_{12}$-HxCDF, $^{13}C_{12}$-HxCDD, $^{13}C_{12}$-HpCDF, $^{13}C_{12}$-HpCDD, and $^{13}C_{12}$-OCDD by substituting the appropriate method internal standard SIM responses and concentrations into the equation.

9.3.3 Daily QA/QC and end of project requirements follow the general procedures outlined in Section 9.1.

9.3.4 Interferences

9.3.4.1 Interferences may be caused by contaminants in solvents, reagents, glassware, and other sample processing that lead to elevated backgrounds of the ions monitored during analysis. Therefore, positive identification of all peaks is necessary.

If a peak appears to contain interferences which cannot be circumvented by use of a secondary or tertiary ion, either: (1) reanalyze the sample on a different column which provides the required resolution or (2) perform additional chemical cleanup and then reanalyze the sample.

9.3.4.2 Monitor possible interference by chlorinated diphenyl ethers (CDPE) with PCDD/PCDF.

9.3.4.2.1 Monitoring for ion masses of possible furan interferents (chlorinated diphenyl ethers, CDPE) will be completed for all samples where a positive furan response is obtained. The CDPE compounds will be monitored simultaneously with the PCDFs. Specifically, m/z 374 (HxDPE) will be monitored versus m/z 304 and 306 (TCDF); m/z 408 (HpDPE) versus m/z 338 and 340 (PCDF); m/z 444 (ODPE) versus m/z 374 and 376 (HxCDF); m/z 478 (NDPE) versus m/z 408 and 410 (HpCDF); and m/z 572 (DDPE) versus m/z

442 and 444 (OCDF). These monitoring procedures are provided in Table 1 of the ASME analytical protocol. See Table 9-5 for a summary of CDPE ions.

9.3.4.2.2 The presence of possible interferents can be verified by monitoring the PCDF ions and corresponding CDPE ions within a retention window. Simultaneous responses for the specific PCDF homologs at the appropriate ratio and retention time and no response to the corresponding CDPE will provide positive identification of the PCDF.

9.3.4.2.3 Either $(M+4)^+$ or $(M-COCl)^+$ will be monitored as an addition confirmation of positive furan and dioxin response. These ions will be monitored simultaneously with the CDPE and PCDFs. Specifically, the $(M-COCl)^+$ ions monitored are m/z 311 (HxCDF); m/z 327 (HxCDD); m/z 345 (HpCDF); m/z 361 (HpCDD); m/z 379 (OCDF); and m/z 395 (OCDD). The $(M+4)^+$ ions monitored are m/z 308 (TCDF); m/z 324 (TCDD); mz/ 342 (PeCDF); and m/z 358 (PeCDD). The presence of either $(M+4)^+$ or $(M-COCl)^+$ ions indicates a positive dioxin or furan response.

9.4 GC/MS Sample Analysis, Data Reduction, and Data Entry

All data will be recorded on a digital storage device (magnetic disk, tape, etc.) for qualitative and quantitative data reduction as discussed below.

9.4.1 GC/MS Sample Analysis

9.4.1.1 The sample may be analyzed after performance of the system has been certified for the day and all instrument conditions set according to the prescribed criteria.

9.4.1.2 While the highest available chromatographic resolution is not a necessary objective, good chromatographic performance is recommended. With the high resolution of HRGC, the probability that the chromatographic peaks consist of single compounds is higher than with packed column gas chromatography (PGC). Thus, qualitative and quantitative data reduction should be more reliable.

9.4.1.3 If the response for any ion, including method internal standards (surrogates) and recovery internal standards, exceeds the working range of the system, dilute the sample and reanalyze. If the responses of method internal standards (surrogates), recovery internal standards, or analytes are below the working range, recheck the system performance. If necessary, concentrate the sample and reanalyze.

9.4.1.4 The instrumental performance must be monitored from run to run. The areas of recovery internal standards must be consistent (e.g., ± 50%). If a low area is encountered, the injection may be suspect.

9.4.1.5 The resolution and peak shape of the method internal standards, recovery internal standards, and other peaks should be monitored during or immediately after data acquisition. Poor chromatography may indicate a bad injection, matrix interferences, or column degradation.

TABLE 9-5

CHLORINATED DIPHENYL ETHER (CDPE) IONS MONITORED DURING PCDD/PCDF ANALYSIS

Homlog	Dioxins (m/e)	Furans (m/e)	PFK (Reference)	Molecular Weight Diphenyl ether Interference
Tetrachloro-	319.9/321.9	303.9/305.9	330.9	373.8
Pentachloro-	355.9/357.9	337.9/339.9		407.8
Hexachloro-	389.8/391.8	373.8/375.8	380.9	443.7
Heptachloro-	423.8/425.8	407.8/409.8	380.9	477.7
Octachloro-	457/459.7	441.7/443.7		511.7

9.4.1.6 If a "dirty" sample is encountered, the analyst must employ appropriate measures to demonstrate that there is no memory or carry- over to subsequent samples. To assess the system cleanliness, a standard, blank sample, or solvent blank will be run.

9.4.1.6.1 Solvent blanks: A solvent blank (e.g., tridecane) is run after calibration and before any samples are run to ensure that there is no carryover after the standards. Other solvent blanks are run after any especially dirty sample or other evidence of potential cross-contamination.

9.4.1.6.2 Syringes: The syringes being used to inject samples are a potential source of contamination. A separate syringe is used for standards than is used for blanks and samples. Syringes are thoroughly rinsed between injections using toluene. The syringe is filled with toluene and sonicated. This procedure is repeated at least twice. If any syringe becomes grossly contaminated, or if it cannot be cleaned to below background, it is discarded and a new syringe used.

If the system is contaminated, remedial efforts may include (a) changing or cleaning the syringe, (b) cleaning the injector, (c) baking out the column close to its maximum temperature, (d) changing to a new column, or (e) cleaning the ion source.

9.4.2 GC/MS Data Reduction

The quantification of the sample is based on the internal standard method in which a constant amount of the recovery internal standard is added to all samples, blanks, and calibration standards just prior to analysis.

The raw data for the quantification of the sample components consists of the computer-measured peak areas or peak heights of the characteristic mass fragmentation ions of the method internal and recovery internal standards and the analytes of interest. The raw data are converted to concentrations by using mass spectrometric response factors relative to the appropriate internal standard.

9.4.2.1 Determination of the relative response factors (RRF)

9.4.2.1.1 For initial calibration and certification of the GC/MS method, a minimum of three compound concentration levels covering a significant portion of the linear range of the instrument will be used to determine instrument sensitivity and linearity.

9.4.2.1.2 The relative response factors are calculated according to the equations found in Section 9.3.

9.4.2.1.3 Ideally the response factors are constant over the entire concentration range of interest. However, if the response factors vary with concentration, the relative response factor (RRF) may be plotted against the peak area or peak height of the analytes in the calibration standards, using a minimum of three concentrations over the range of interest.

9.4.2.2 Peak identification

9.4.2.2.1 Qualitative peak identification - full scan or SIM

9.4.2.2.1.1 Retention time: The peak must elute within the retention time windows set for that analyte. The intensities of the primary and secondary ions must maximize essentially simultaneously (within ± 1 sec).

9.4.2.2.1.2 Ion ratio: The characteristic fragmentation ions of the sample should be compared to that of a calibration standard. The intensity of the ions in the sample must match the ratio observed for a standard within ± 20%.

9.4.2.2.1.3 The analyst must search the higher mass windows, for example M + 35, to prevent misidentification of a fragment ion cluster as the parent.

9.4.2.2.1.4 System noise at low concentration or interferences may skew the ion ratio beyond the ± 20% criteria. If in the analyst's best judgment, a peak which does not meet the qualitative criteria is a match and the peak is at least 3 times the background noise, the peak may be included in the calculation with a footnote explaining the data and the reason for relaxing the criteria.

9.4.2.2.2 Quantitative peak identification - SIM

9.4.2.2.2.1 After a chromatographic peak has been identified as a positive match, the compound is quantitated based either on the SIM data for the primary and secondary characteristic ion in the appropriate tables listed in Section 9.3. If interferences are observed for the primary ion, use the secondary and then tertiary ion for quantitation. Whichever ion is used, the RRF must be determined using that ion. The same criteria should be applied to the internal standard compounds.

9.4.2.2.2.2 For the higher mass analytes, the mass defect from unity is significant. Areas, EICPs, etc., must be based on the true mass, not the nominal mass, or erroneous results may be obtained. The data quality must be monitored with great care for the higher mass analytes.

9.4.2.2.2.3 Following sample analysis, the appropriate response factor is taken from the calibration curve (generated from Equation No. 1) and the concentration of the compound in the sample extract is calculated according to the equation:

Equation: $$\text{PCDD/PCDF Concentration} = \frac{(A_S)(C_{IS})}{(A_{IS})(RRF)}$$

It is very important to determine the correct dilution factor to translate the concentration in the extract to the concentration of sample in the sample matrix.

9.4.2.2.2.4 Sum all of the peaks for each analyte to yield the total mass in the sample. If a concentration-per-peak or concentration-per-analyte reporting format is desired, carry each value through the calculations in an appropriate manner.

For some samples, for example the combined MM5 train extracts, the analytical chemists determine the total amount, i.e., ng, of a PCDD/PCDF found in the sample rather than a concentration. These data are then provided to the Engineering Support Staff who calculate the concentrations of the components in the stack based on the volume of dry stack gas sampled.

9.4.2.2.2.5 All GC/MS quantification values will be calculated to three significant figures and rounded off to two significant figures.

9.4.2.2.3 Minimum detection limit (method detection limit)

The procedure used to determine the MDL values is taken from Appendix A of EPA Test Methods Manual, EPA-600/4-82-057, July 1982, "Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater." MDL is defined as the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the value is above zero.

9.4.2.2.3.1 The chromatogram is examined at the scan corresponding to a known eluting peak (± 10 scans).

9.4.2.2.3.2 The area associated with the proper region of the lesser abundant ion is multiplied by 2.5.

9.4.2.2.3.3 The product of the lesser abundant area multiplied by 2.5 is then corrected to produce a corresponding area of the major ion. This is accomplished by multiplying the product by the correct abundance ratio.

9.4.2.2.3.4 The area determined in step 9.4.2.2.3.3 is then used to calculate a corresponding concentration value as in Section 9.4.2.2.2.3.

9.4.2.2.4 Data entry: Data transfer and reduction are essential functions in summarizing information to support conclusions. It is essential that these processes are performed accurately and, in the case of data reduction, accepted statistical techniques are used.

9.4.2.2.4.1 The entry of input data may be onto a specialized raw data worksheet utilizing the LOTUS 1-2-3 spreadsheet software package and a HP 110 portable computer (or any computer) with any other compatible software package.

9.4.2.2.4.2 Example calculations must be included with the summarized data to facilitate review. The entry of input data and calculations should be checked and the signature/initials of the data analyst, data processor, and reviewer(s) should accompany all data transfers. See Figures 9-1 through 9-4 for examples of the raw data worksheets.

9.5 Deviations from ASME 1984 Draft Protocol

9.5.1 The ASME protocol outlines a two column method (60 m DB-5 and 30 m DB-225) if data are required to 2,3,7,8-TCDD/TCDF and total PCDD/PCDF. MRI uses only the 60 m DB-5, but employs a longer temperature program and higher mass spectrometer resolution than the ASME method, thus allowing MRI to achieve adequate resolution.

9.5.2 ASME protocol specifies the use of hydrogen as carrier gas (rather than helium) and a transfer line temperature of 250°C (rather than 280 to 300°C). These are considered minor deviations and inconsequential to GC/MS performance.

9.5.3 ASME protocol does not specify the monitoring of $(M+4)^+$ or (M-COCl) ions. As stated in Section 9.3.4.2.3, monitoring provides an additional confirmation of positive furan or dioxin response.

ASME1

PAGE 1 : TOTAL ANALYSIS

STANDARD SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF STANDARDS

RESPONSE FACTOR (RF) = (AREA(S)/AREA(IS))*(CONC.(IS)/CONC.(S))

PROJECT NO:
GC/MS DATA FILE:
SAMPLE ID:

RECOVERY INTERNAL STANDARDS	
13C-1,2,3,4-TCDD	94.0 PG/UL
13C-1,2,3,7,8,9-HxCDD	200 PG/UL

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	50.0 PG/UL
13C-1,2,3,7,8-PeCDF	100 PG/UL
13C-1,2,3,6,7,8-HxCDF	200 PG/UL
13C-1,2,3,4,6,7,8-HpCDF	200 PG/UL

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDD	50.0 PG/UL
13C-1,2,3,7,8-PeCDD	100 PG/UL
13C-1,2,3,6,7,8-HxCDD	200 PG/UL
13C-1,2,3,4,6,7,8-HpCDD	200 PG/UL
13C-OCDD	500 PG/UL

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR	CONC.ST (PG/UL)	TOTAL AREA	ACTUAL ION RATIO	ANALYTE #	QUANTITATED AGAINST #
	13C-1,2,3,4-TCDD	332/334 (76/100)	332	1.000	94.0			1	
	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402	1.000	200			2	
	13C-2,3,7,8-TCDF	316/318 (76/100)	316					3	1
	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	352					4	1
	13C-1,2,3,6,7,8-HxCDF	386/388 (100/82)	386					5	2
	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420					6	2
	13C-2,3,7,8-TCDD	332/334 (76/100)	332					7	1
	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368					8	1
	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402					9	2
	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436					10	2
	13C-OCDD	470/472 (87/100)	472					11	2
	TOTAL-TETRA-CDF	304/306 (76/100)	304+306						3
	TOTAL-PENTA-CDF	338/340 (61/100)	338+340						4
	TOTAL-HEXA-CDF	374/376 (100/82)	374+376						5
	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410						6
	OCTA-CDF	442/444 (87/100)	442+444						11
	TOTAL-TETRA-CDD	320/322 (76/100)	320+322						7
	TOTAL-PENTA-CDD	354/356 (61/100)	354+356						8
	TOTAL-HEXA-CDD	390/392 (100/82)	390+392						9
	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426						10
	OCTA-CDD	458/460 (87/100)	458+460						11

GC/MS ANALYST: ANALYST DATE: DATA ENTRY REVIEWED:____________ DATE: ________

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Figure 9-1

ASME1

PAGE 2: NATIVE 2,3,7,8 SUBSTITUTED ANALYTES

STANDARD SPREADSHEET FOR THE QUANTITATION OF SPECIFIC TETRA-OCTA CDD/CDF STANDARDS

RESPONSE FACTOR (RF) = (AREA(S)/AREA(IS))*(CONC.(IS)/CONC.(S))

PROJECT NO:
GC/MS DATA FILE:
SAMPLE ID:

RECOVERY INTERNAL STANDARDS

13C-1,2,3,4-TCDD	94.0 PG/UL
13C-1,2,3,7,8,9-HxCDD	200 PG/UL

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	50.0 PG/UL
13C-1,2,3,7,8-PeCDF	100 PG/UL
13C-1,2,3,6,7,8-HxCDF	200 PG/UL
13C-1,2,3,4,6,7,8-HpCDF	200 PG/UL

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDD	50.0 PG/UL
13C-1,2,3,7,8-PeCDD	100 PG/UL
13C-1,2,3,6,7,8-HxCDD	200 PG/UL
13C-1,2,3,4,6,7,8-HpCDD	200 PG/UL
13C-OCDD	500 PG/UL

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR	CONC ST (PG/UL)	TOTAL AREA	ACTUAL ION RATIO	ANALYTE #	QUANTITATED AGAINST #
	2,3,7,8-TETRA-CDF	304/306 (76/100)	304+306					12	3
	1,2,3,7,8-PENTA-CDF	338/340 (61/100)	338+340					13	4
	2,3,4,7,8-PENTA-CDF	338/340 (61/100)	338+340					14	4
	1,2,3,4,7,8-HEXA-CDF	374/376 (100/82)	374+376					15	5
	1,2,3,6,7,8-HEXA-CDF	374/376 (100/82)	374+376					16	5
	2,3,4,6,7,8-HEXA-CDF	374/376 (100/82)	374+376					17	5
	1,2,3,7,8,9-HEXA-CDF	374/376 (100/82)	374+376					18	5
	1,2,3,4,6,7,8-HEPTA-CDF	408/410 (100/98)	408+410					19	6
	1,2,3,4,7,8,9-HEPTA-CDF	408/410 (100/98)	408+410					20	6
	OCTA-CDF	442/444 (87/100)	442+444					21	11
	2,3,7,8-TCDD	320/322 (76/100)	320+322					22	7
	1,2,3,7,8-PENTA-CDD	354/356 (61/100)	354+356					23	8
	1,2,3,4,7,8-HEXA-CDD	390/392 (100/82)	390+392					24	9
	1,2,3,6,7,8-HEXA-CDD	390/392 (100/82)	390+392					25	9
	1,2,3,7,8,9-HEXA-CDD	390/392 (100/82)	390+392					26	9
	1,2,3,4,6,7,8-HEPTA-CDD	424/426 (100/99)	424+426					27	10
	OCTA-CDD	458/460 (87/100)	458+460					28	11

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Figure 9-1 (concluded)

ASME2

PAGE 1 : TOTAL ANALYSIS

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF SCRUBBER WATER EXTRACTS

PROJECT NO:
GC/MS DATA FILE:
SAMPLE ID:

RECOVERY INTERNAL STANDARDS

13C-1,2,3,4-TCDD	2.35 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.50 NG
13C-1,2,3,7,8-PeCDF	5.00 NG
13C-1,2,3,6,7,8-HxCD	10.0 NG
13C-1,2,3,4,6,7,8-Hp	10.0 NG

SPLIT RATIO =

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeC	5.00 NG
13C-1,2,3,6,7,8-H	10.0 NG
13C-1,2,3,4,6,7,8	10.0 NG
13C-OCDD	25.0 NG

VOLUME EXTRACTED = LITER

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*(AMT(IS)/RF)*SPLIT RATIO

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG/L) = (AREA(S)/AREA(IS)*AMT(IS)/RF)*SPLIT RATIO/VOLUME EXTRACTED

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG/L)	SURROGATE RECOVERY (%)
	13C-1,2,3,4-TCDD	332/334 (76/100)	332			NA	2.35	NA
	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402			NA	5.00	NA
	13C-2,3,7,8-TCDF	316/318 (76/100)	316					
	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	352					
	13C-1,2,3,6,7,8-HxCDF	386/388 (100/82)	386					
	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420					
	13C-2,3,7,8-TCDD	332/334 (76/100)	332					
	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368					
	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402					
	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436					
	13C-OCDD	470/472 (87/100)	472					
NA	TOTAL-TETRA-CDF	304/306 (76/100)	304+306					
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340					
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376					
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410					
NA	OCTA-CDF	442/444 (87/100)	442+444					
NA	TOTAL-TETRA-CDD	320/322 (76/100)	320+322					
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356					
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392					
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426					
NA	OCTA-CDD	458/460 (87/100)	458+460					

GC/MS ANALYST:	ANALYST DATE:	DATA ENTRY REVIEWED:__________ DATE:________
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Figure 9-2

ASME2

PAGE 2: NATIVE 2,3,7,8 SUBSTITUTED ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF SPECIFIC TETRA-OCTA CDD/CDF SCRUBBER WATER EXTRACTS

AMOUNT IN SAMPLE (NG/L) = (AREA(S)/AREA(IS)*AMT(IS)/RF)*SPLIT RATIO/VOLUME EXTRACTED

PROJECT NO:
GC/MS DATA FILE:
SAMPLE ID:

RECOVERY INTERNAL STANDARDS

13C-1,2,3,4-TCDD	2.35 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.50 NG
13C-1,2,3,7,8-PeCDF	5.00 NG
13C-1,2,3,6,7,8-HxCD	10.0 NG
13C-1,2,3,4,6,7,8-Hp	10.0 NG

SPLIT RATIO =

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeC	5.00 NG
13C-1,2,3,6,7,8-H	10.0 NG
13C-1,2,3,4,6,7,8	10.0 NG
13C-OCDD	25.0 NG

SCAN NUMBER	ANALYTE	CHARACTERISITC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG/L)	SURROGATE RECOVERY (%)
	2,3,7,8-TETRA-CDF	304/306 (76/100)	304+306					
	1,2,3,7,8-PENTA-CDF	338/340 (61/100)	338+340					
	2,3,4,7,8-PENTA-CDF	338/340 (61/100)	338+340					
	1,2,3,4,7,8-HEXA-CDF	374/376 (100/82)	374+376					
	1,2,3,6,7,8-HEXA-CDF	374/376 (100/82)	374+376					
	2,3,4,6,7,8-HEXA-CDF	374/376 (100/82)	374+376					
	1,2,3,7,8,9-HEXA-CDF	374/376 (100/82)	374+376					
	1,2,3,4,6,7,8-HEPTA-CDF	408/410 (100/98)	408+410					
	1,2,3,4,7,8,9-HEPTA-CDF	408/410 (100/98)	408+410					
	OCTA-CDF	442/444 (87/100)	442+444					
	2,3,7,8-TCDD	320/322 (76/100)	320+322					
	1,2,3,7,8-PENTA-CDD	354/356 (61/100)	354+356					
	1,2,3,4,7,8-HEXA-CDD	390/392 (100/82)	390+392					
	1,2,3,6,7,8-HEXA-CDD	390/392 (100/82)	390+392					
	1,2,3,7,8,9-HEXA-CDD	390/392 (100/82)	390+392					
	1,2,3,4,6,7,8-HEPTA-CDD	424/426 (100/99)	424+426					
	OCTA-CDD	458/460 (87/100)	458+460					

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Figure 9-2 (concluded)

ASME3

PAGE 1 : TOTAL ANALYSIS

CALIBRATION CURVE RESPONSE FACTOR SUMMARY TABLE FOR TOTAL TETRA-OCTA CDD/CDF

DATA ANALYST:

GC/MS ANALYST:

MRI PROJECT NO.:

INSTRUMENT:

DATE

MODE:

RESPONSE FACTOR (RRF) = (AREA(S)/AREA(IS))*(CONC.(IS)/CONC.(S))

DATE ANALYZED STANDARD CONC. DATA FILE NO. AREA R.I.S	AVERAGE RESPONSE FACTOR	% RSD (RRF)
13C-1,2,3,4-TCDD	1.000	0.00
13C-1,2,3,7,8,9-HxCDD	1.000	0.00
13C-2,3,7,8-TCDF		
13C-1,2,3,7,8-PeCDF		
13C-1,2,3,6,7,8-HxCDF		
13C-1,2,3,4,6,7,8-HpCDF		
13C-2,3,7,8-TCDD		
13C-1,2,3,7,8-PeCDD		
13C-1,2,3,6,7,8-HxCDD		
13C-1,2,3,4,6,7,8-HpCDD		
13C-OCDD		
TOTAL-TETRA-CDF		
TOTAL-PENTA-CDF		
TOTAL-HEXA-CDF		
TOTAL-HEPTA-CDF		
OCTA-CDF		
TOTAL-TETRA-CDD		
TOTAL-PENTA-CDD		
TOTAL-HEXA-CDD		
TOTAL-HEPTA-CDD		
OCTA-CDD		

Figure 9-3

ASME3

PAGE 2 : NATIVE 2,3,7,8 SUBSTITUTED ANALYTES

CALIBRATION CURVE RESPONSE FACTOR SUMMARY TABLE FOR SPECIFIC TETRA-OCTA CDD/CDF

DATA ANALYST:

MRI PROJECT NO.:

DATE

GC/MS ANALYST:

INSTRUMENT:

MODE:

RESPONSE FACTOR (RRF) = (AREA(S)/AREA(IS))*(CONC.(IS)/CONC.(S))

DATE ANALYZED STANDARD CONC. DATA FILE NO. AREA R.I.S	AVERAGE RESPONSE FACTOR	% RSD (RRF)
2,3,7,8-TETRA-CDF		
1,2,3,7,8-PENTA-CDF		
2,3,4,7,8-PENTA-CDF		
1,2,3,4,7,8-HEXA-CDF		
1,2,3,6,7,8-HEXA-CDF		
2,3,4,6,7,8-HEXA-CDF		
1,2,3,7,8,9-HEXA-CDF		
1,2,3,4,6,7,8-HEPTA-CDF		
1,2,3,4,7,8,9-HEPTA-CDF		
OCTA-CDF		
2,3,7,8-TCDD		
1,2,3,7,8-PENTA-CDD		
1,2,3,4,7,8-HEXA-CDD		
1,2,3,6,7,8-HEXA-CDD		
1,2,3,7,8,9-HEXA-CDD		
1,2,3,4,6,7,8-HEPTA-CDD		
OCTA-CDD		

Figure 9-3 (concluded)

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ASME4

PAGE 1 : TOTAL ANALYSIS
                         RESPONSE FACTOR COMPARISON TABLE FOR TOTAL TETRA-OCTA CDD/CDF


DATA ANALYST:                                                           GC/MS ANALYST:

MRI PROJECT NO.:                                                        INSTRUMENT:

DATE                                                                    MODE:
-----------------------------------------------------------------------------------------

                 RESPONSE FACTOR (RRF) = (AREA(S)/AREA(IS))*(CONC.(IS)/CONC.(S))

-----------------------------------------------------------------------------------------
DATE ANALYZED
STANDARD CONC.             AVERAGE               RANGE     RANGE
DATA FILE NO.              RESPONSE      %RSD    (RRF)     (RRF)
AREA R.I.S                  FACTOR      (RRF)     -30%      +30%
-----------------------------------------------------------------------------------------
    13C-1,2,3,4-TCDD                              0.000     0.000

  13C-1,2,3,7,8,9-HxCDD                           0.000     0.000
-----------------------------------------------------------------------------------------
    13C-2,3,7,8-TCDF                              0.000     0.000

   13C-1,2,3,7,8-PeCDF                            0.000     0.000

  13C-1,2,3,6,7,8-HxCDF                           0.000     0.000

 13C-1,2,3,4,6,7,8-HpCDF                          0.000     0.000

    13C-2,3,7,8-TCDD                              0.000     0.000

   13C-1,2,3,7,8-PeCDD                            0.000     0.000

  13C-1,2,3,6,7,8-HxCDD                           0.000     0.000

 13C-1,2,3,4,6,7,8-HpCDD                          0.000     0.000

        13C-OCDD                                  0.000     0.000
-----------------------------------------------------------------------------------------
     TOTAL-TETRA-CDF                              0.000     0.000

     TOTAL-PENTA-CDF                              0.000     0.000

     TOTAL-HEXA-CDF                               0.000     0.000

     TOTAL-HEPTA-CDF                              0.000     0.000

        OCTA-CDF                                  0.000     0.000

     TOTAL-TETRA-CDD                              0.000     0.000

     TOTAL-PENTA-CDD                              0.000     0.000

     TOTAL-HEXA-CDD                               0.000     0.000

     TOTAL-HEPTA-CDD                              0.000     0.000

        OCTA-CDD                                  0.000     0.000
-----------------------------------------------------------------------------------------
```

Figure 9-4

ASME4

PAGE 2 : NATIVE 2,3,7,8 SUBSTITUTED ANALYTES

RESPONSE FACTOR COMPARISON TABLE FOR SPECIFIC TETRA-OCTA CDD/CDF

DATA ANALYST:

MRI PROJECT NO.:

DATE

GC/MS ANALYST:

INSTRUMENT:

MODE:

RESPONSE FACTOR (RRF) = (AREA(S)/AREA(IS))*(CONC.(IS)/CONC.(S))

DATE ANALYZED STANDARD CONC. DATA FILE NO. AREA R.I.S	AVERAGE RESPONSE FACTOR	%RSD (RRF)	RANGE (RRF) -30%	RANGE (RRF) +30%
2,3,7,8-TETRA-CDF			0.000	0.000
1,2,3,7,8-PENTA-CDF			0.000	0.000
2,3,4,7,8-PENTA-CDF			0.000	0.000
1,2,3,4,7,8-HEXA-CDF			0.000	0.000
1,2,3,6,7,8-HEXA-CDF			0.000	0.000
2,3,4,6,7,8-HEXA-CDF			0.000	0.000
1,2,3,7,8,9-HEXA-CDF			0.000	0.000
1,2,3,4,6,7,8-HEPTA-CDF			0.000	0.000
1,2,3,4,7,8,9-HEPTA-CDF			0.000	0.000
OCTA-CDF			0.000	0.000
2,3,7,8-TCDD			0.000	0.000
1,2,3,7,8-PENTA-CDD			0.000	0.000
1,2,3,4,7,8-HEXA-CDD			0.000	0.000
1,2,3,6,7,8-HEXA-CDD			0.000	0.000
1,2,3,7,8,9-HEXA-CDD			0.000	0.000
1,2,3,4,6,7,8-HEPTA-CDD			0.000	0.000
OCTA-CDD			0.000	0.000

Figure 9-4 (concluded)

10.0 GC/MS Data Validation, Reporting, Documentation, and Storage

10.1 GC/MS Data Validation

The principal criteria that will be used to validate the integrity of the GC/MS data acquired and reported during a project will be the following:

10.1.1 Verification on a frequent basis by the Analytical Task Leader that all raw data generated in the preceding week have been stored on magnetic tape and/or in hard copy and that storage locations have been documented in the laboratory records.

10.1.2 Examination of at least 5% of the raw data (e.g., mass chromatograms) on a frequent basis by the Analytical Task Leader to verify adequacy of documentation, confirm peak shape and resolution, assure that the computer was sensing peaks appropriately, etc.

10.1.3 Confirmation by the GC/MS operator that raw areas for internal standards and calibration standards and raw and relative areas for surrogate compounds are within 50% of the expected value.

10.1.4 Reporting by the GC/MS facility of all associated blank, standard, and QC data along with results for analyses of each batch of samples to the Analytical Task Leader.

10.1.5 Reporting by the GC/MS facility of all analytical data for samples and blanks to the Analytical Task Leader.

10.2 GC/MS Data Reporting to the Appropriate Project Manager or Client

Two types of GC/MS data reporting formats may be required.

- Amount and/or concentration of specific POHCs in a given sample.
- Identities and estimated amounts of all major sample components.

When only the results of the POHC analyses are of interest in a set of samples, e.g., the POHC level data from all the samples associated with a trial burn, the results will be reported to the Engineering Support Staff in a simple table. The units will vary with the type of sample. For example a waste feed concentration is reported in µg/g, a MM5 combined extract is reported in total µg or ng, and a scrubber effluent extract is reported as µg/L.

10.3 Documentation Procedure

The documents for a project include a Program and Quality Assurance Planning Document, data reports, letters of transmittal, records of telephone conversations relative to the project, and all data and records associated with work on the project.

10.3.1 A tremendous quantity of data and information will be generated during the conduct of the analytical aspects of a project, all of which must be archived. The Analytical Task Leader is responsible for directing the archiving of the sample information including the following:

- Dates and condition of sample receipt.
- Storage location of samples and extracts.
- Date of sample extraction, workup, and analysis.
- Sample numbering and identification scheme.
- Dates of GC/MS analyses.
- All volumes and weights used.
- Dilution and concentration factors.
- Amounts of method and recovery internal standards used.
- Method and recovery internal standard area responses.
- Injection volumes.
- Relative response factors used for quantification.
- Scan number and retention time of GC/MS peaks.
- Most intense mass spectral fragmentations.
- Absolute and/or relative retention times.
- Compound identification.
- Total ion chromatograms.
- Library search results.
- 9-Track tape or streamer tape storage files of all GC/MS data.
- Backup 9-track or streamer tape storage files of all GC/MS data.
- Results of analysis of calibration standards.
- Mass spectrometer tuning results.
- Instrument maintenance records.
- Instrument operation parameters.

10.3.2 Most of the data and information will be taken from the computer hard-copy output, from the LRBs and from total ion chromatograms. In most cases, the recording of the data and information is straightforward. Some of the specific details are discussed below.

10.3.2.1 One project LRB will be used to record all sample receipt, logging, and storage, information.

10.3.2.2 All samples and sample extracts will be carefully labeled with a unique number traceable to the log-in LRB.

10.3.2.3 One program LRB will be used for field sampling and one for each analyst for the trial burns to record all information pertaining to sample extraction, screening, and preparation for GC/MS analysis.

10.3.2.4 One program LRB will be used for the study to record all information pertaining to standard preparation, GC sample screening, GC/MS sample injection log, and GC/MS performance standard check information.

10.3.2.5 The solvent source and chemical lot numbers will be recorded in the experimental LRBs.

10.3.2.6 The details of the GC/MS analyses will be recorded in notebooks assigned to each GC/MS instrument.

10.3.2.7 GC/MS data will be taped at regular intervals (i.e., weekly) to provide a backup to the data on disk and for permanent storage of the data at the end of the project.

10.3.2.8 All GC/FID/ECD chromatograms from sample screening studies will be placed into file folders, labeled with sample number and project number and stored with the Analytical Task Leader at the end of the project.

10.3.2.9 All GC/MS computer outputs will be placed into file folders labeled with sample number and project number and stored with the Analytical Task Leader at the end of the project until final archiving.

10.3.2.10 All project LRBs and other related data will be archived in the main MRI vault at the end of the project.

10.3.2.11 The GC/MS notebooks will be controlled by the GC/MS Facility Manager.

10.4 GC/MS Data Storage

All computer generated mass spec data will be transferred from the original storage medium (hard disk drives) to magnetic tape for permanent storage. All magnetic tapes will be stored in a locked lab. The organization of the data files stored on magnetic tape include: (a) identifying number on each magnetic tape recorded in chronological order, and (b) all file names archived are recorded in a hard-bound magnetic tape lab book. Entries into the hard-bound books include information regarding magnetic tape number and a block number indicating location of data on a magnetic tape.

11.0 Specific Routine Procedures to Assess Data Precision, Accuracy, and Completeness

11.1 Precision

The precision of a series of measurements on replicate samples gives an indication of the reproducibility of the sample concentration measurements. Determination of the precision of replicate measurements begins by calculating the mean (average), $\overline{C}$, of the concentrations, Ci, according to the equation:

$$\overline{C} = \frac{1}{N} \sum_{i-1}^{n} Ci$$

where n = number of replicate measurements
Ci = the concentration in appropriate units

The estimate of precision of a series of more than two replicate measurements can then be expressed as the percent relative standard deviation, RSD:

$$P = RSD = \frac{SD}{\overline{C}} \times 100\%$$

where SD = standard deviation

P = precision

$$SD = \sqrt{\frac{\sum_{i=1}^{n} (Ci - \overline{C})^2}{(n-1)}}$$

The estimate of precision of a series of replicate (< 3) measurements can be expressed as the relative percent different, RPD:

$$P = RPD = \frac{|C_1 - C_2|}{C} \times 100\%$$

Quantification of mass spectral data depends on the determination and application of mass spectrometric response factors relative to an internal standard (method internal standard or recovery internal standard as appropriate) as determined from analysis of calibration standards. Precision data from the analysis of samples by mass spectrometry will be presented along with the precision data for the mass spectrometric response factors. It will then be possible to determine if the observed variation in the sample concentration data is due solely to the variability in the mass spectrometric response or if some of the variability is due to other analysis procedures, e.g., in the sample extraction and workup steps.

Precision is calculated for (1) recovery of method internal standards (surrogates) and native compounds from duplicate samples (samples obtained by replicate extractions), (2) recovery of method internal standards (surrogates) and native compounds from replicate analysis of one sample, (3) recovery of method internal standards (surrogates) of all the various types of sample matrices analyzed, and (4) mean relative response factors established by the calibration curve, and the relative response factors of the daily standards. The first or second occasion calculating precision uses method RSD or RPD while for the third and fourth occasion, replicate surrogate spiking and standards may use the RSD method only.

1. Duplicate samples (RPD or RSD)
2. Replicate analysis (RPD or RSD)
3. Replicate surrogate spiking (RSD)
4. Standards (RSD)

11.2 Accuracy

Accuracy is the degree of agreement of a measurement (or an average of measurements of the same thing), C, with an accepted reference or true value, T, expressed:

$$\text{as a ratio:} \quad A = \frac{C}{T} \times 100\%$$

where A = accuracy
C = the amount found
T = the true amount spiked

Accuracy will be calculated using the recovery of method internal standards (surrogate) and native compounds spiked into all of the various types of sample matrices analyzed and also from the results of analysis of blind performance audit and performance evaluation samples prepared and supplied by MRI's Quality Assurance Coordinator (QAC).

The blind performance audit sample is a mixture of the appropriate standards prepared by MRI's QAC used to check the performance of the GC/MS system and verify calibration. The blind performance evaluation samples are samples spiked by MRI's QAC and taken through the same laboratory extraction procedures as all the other samples and used to evaluate the laboratory SOP.

11.2.1 For method internal standard (surrogate) compounds the accuracy is defined as follows:

$$\text{Accuracy} = \text{Percent Recovery} = \frac{\text{Amount Found}}{\text{Amount Spiked}} \times 100\%$$

11.2.2 Accuracy is defined in Section 11.2.1 and represents the percent recovery of compounds spiked into the performance audit and performance evaluation samples.

11.2.3 The amounts may be expressed in the appropriate concentration units such as micrograms per gram (µg/g) for waste samples, micrograms per liter (µg/L) for water samples, and total micrograms (µg) for XAD-2 and air particulate filter/probe rinse residue samples.

11.3 Data Completeness

Data completeness will be determined from the analysis results of the quality assurance samples discussed above, i.e., the 10% replicate unspiked and spiked samples and the performance audit samples supplied by MRI's quality assurance monitor.

The specific goals of the analyses are to generate analytical results which are within predetermined limits for precision and accuracy as follows:

Precision: No precision values, i.e., percent relative standard deviations, shall exceed the average precision of a series of measurements ± two standard deviation units and in no case shall the precision exceed 20%.

Accuracy: Accuracy from analysis of spiked samples or unknown performance audit samples shall lie within a range of 60-120%.

The overall completeness prerequisite for the program will be that 90% of all the quality assurance measurements for precision and accuracy made for the program fall within the precision and accuracy limits indicated above.

11.4 Outlying Data

Refer to ASTM Method E178-61T (issued 1961), "Tentative Recommended Practice for Dealing with Outlying Observations" if further criteria is needed for accessing outlying data.

12.0 Preventive Maintenance

12.1 Mass Spectrometry Facility

The MRI Mass Spectrometry Facility houses several GC/MS systems. A regular maintenance program for the mass spectrometry laboratory is practiced to assure the proper operation of all equipment. The program consists of both scheduled (preventive maintenance) and nonscheduled maintenance procedures. All maintenance procedures performed on the instruments are recorded in the maintenance LRB in the GC/MS lab. In addition, any instrument repair not performed by the laboratory personnel is handled by the electronic support service group which also adheres to a recordkeeping program. For more detailed preventive maintenance, please refer to procedures specified by each instrument SOP.

12.1.1 The scheduled maintenance involves the service performance of the instruments at regular intervals and covers such activities as the following:

- Clean ion source.
- Change pump oil.
- Add calibration compounds to reservoir.
- Clean and adjust computer disk heads.
- Change GC septa.
- Change filters in the computer disk drives.
- Change the filters in the cooling water lines.

12.1.2 The nonscheduled maintenance program involves the necessary servicing of equipment on an "as needed" basis. This can include items in the scheduled maintenance program but most often involves these types of services:

- Check or replace ferrules and tighten transfer line nuts.
- Replace gaskets.
- Clean or replace the jet separator.
- Replace thermistors and fuses.
- Clean the ion source following unexpected "dirty" samples.
- Replace filament.
- Multiplier replacement.

12.2 Gas Chromatographs

All routine preventive maintenance performed for gas chromatographs also will also be performed for the GC/MS equipment.

GC septa will be replaced on a weekly basis or more frequently as needed when symptoms of septum deterioration are noted. Frequent injections will require replacement on a daily basis. Carrier and detector gases will be changed when the supply of gas in the cylinders falls below 100 psi to prevent contaminants from reaching the detector or columns. Molecular sieves and oxygen traps used in the gas lines will be replaced on a regular basis. GC detectors will be periodically removed and cleaned to remove accumulations which can affect instrument performance. Instrument calibration curves will be monitored and compared to historical performance criteria. Excessive noise, low response, and poor precision are indicators of a "dirty" detector and may necessitate more frequent detector cleaning. Spare columns, packing materials, instrument cables, and PC boards will be available in case of breakage or malfunction to minimize instrument downtime.

12.3 Analytical Balance

Analytical balances will be cleaned and calibrated on a yearly basis by manufacturers' representatives. The accuracy of analytical balances will be compared to Class S standard weights monthly.

ADDENDUM

The Lotus 1-2-3 spreadsheets (Figures A-1 through A-4) that will be used for Validation on Emission Test Method for Dioxins(IV), EPA Contract No. 68-02-3999 differ from the spreadsheets (Figures 9-1 through 9-4) normally used for PCDD/PCDF analysis. The spreadsheets are divided into sections as recovery internal standard, method internal standards, static field spike, and dynamic field spikes.

STANDARD SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF STANDARDS

RESPONSE FACTOR (RF) = (AREA(S)/AREA(IS))*(CONC.(IS)/CONC.(S))

PROJECT NO: 898SL11
GC/MS DATA FILE: 8985
SAMPLE ID:

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD 196 PG/UL

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	PG/UL
13C-2,3,7,8-TCDD	PG/UL
13C-1,2,3,7,8-PeCDD	PG/UL
13C-1,2,3,4,6,7,8-HpCDD	PG/UL

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	PG/UL
13C-1,2,3,4,7,8-HxCDF	PG/UL
13C-OCDF	PG/UL
13C-1,2,3,4-TCDD	PG/UL
13C-1,2,3,7,8,9-HxCDD	PG/UL
13C-OCDD	PG/UL

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR	CONC.ST (PG/UL)	TOTAL AREA	ACTUAL ION RATIO	ANALYTE #	QUANTITATED AGAINST #
	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	196			1	
	13C-2,3,7,8-TCDF	316/318 (76/100)	316					2	1
	13C-2,3,7,8-TCDD	332/334 (76/100)	332					3	1
	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368					4	1
	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436					5	1
	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352					6	4
	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388					7	5
	13C-OCDF	454/456 (87/100)	454+456					8	5
	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334					9	3
	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404					10	5
	13C-OCDD	470/472 (87/100)	470+472					11	5

GC/MS ANALYST: ANALYSIS DATE: DATA ENTRY REVIEWED:____________________ DATE:____________

DATA ANALYST: ANALYSIS DATE: REVIEWED:____________________ DATE:____________

DATA ENTRY: ENTRY DATE: REVIEWED:____________________ DATE:____________

Figure A-1

```
        SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

---------------------------------------------------------------------------------------------------
PROJECT NO:        3795L11           |  METHOD INTERNAL STANDARDS          |      FIELD SPIKED ANALYTES
GC/MS DATA FILE:   0985              |  ---------------------------------  |  -----------------------------
SAMPLE ID:                           |  13C-2,3,7,8-TCDF             NG    |  13C-1,2,3,7,8-PeCDF         NG
-------------------------------------|  13C-2,3,7,8-TCDD             NG    |  13C-1,2,3,4,7,8-HxCDF       NG
     RECOVERY INTERNAL STANDARD      |  13C-1,2,3,7,8-PeCDD          NG    |  13C-OCDF                    NG
-------------------------------------|  13C-1,2,3,4,6,7,8-HpCDD      NG    |  13C-1,2,3,4-TCDD            NG
13C-1,2,3,6,7,8-HxCDD      49.0 NG   |-------------------------------------|  13C-1,2,3,7,8,9-HxCDD       NG
                                     |                                     |  13C-OCDD                    NG
---------------------------------------------------------------------------------------------------
                 SURROGATE RECOVERY = (AREA(S)/AREA(IS))*(AMT(IS)/RRF)
---------------------------------------------------------------------------------------------------
        SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%
---------------------------------------------------------------------------------------------------
                 AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS))*AMT(IS)/RRF)
---------------------------------------------------------------------------------------------------
---------------------------------------------------------------------------------------------------
SCAN                            CHARACTERISTIC IONS    ION    RESPONSE              SURROGATE  AMOUNT
NUMBER        ANALYTE           (THEORETICAL RATIO)    USED   FACTOR       TOTAL    RECOVERY   IN SAMPLE  RECOVERY
                                                              (4/19/88)    AREA     (NG)       (NG)       (%)
---------------------------------------------------------------------------------------------------
        13C-1,2,3,6,7,8-HxCDD        402/404         402      1.000                  NA        49.0       NA
                                     (100/82)
---------------------------------------------------------------------------------------------------
          13C-2,3,7,8-TCDF           316/318         316                                       NA
                                     (76/100)
          13C-2,3,7,8-TCDD           332/334         332                                       NA
                                     (76/100)
         13C-1,2,3,7,8-PeCDD         366/368         368                                       NA
                                     (61/100)
       13C-1,2,3,4,6,7,8-HpCDD       436/436         436                                       NA
                                     (100/99)
---------------------------------------------------------------------------------------------------
 NA      13C-1,2,3,7,8-PeCDF         350/352         350+352
                                     (61/100)
---------------------------------------------------------------------------------------------------
        13C-1,2,3,4,7,8-HxCDF        386/388         386+388
                                     (100/82)
              13C-OCDF               454/456         454+456
                                     (87/100)
           13C-1,2,3,4-TCDD          332/334         332+334
                                     (76/100)
        13C-1,2,3,7,8,9-HxCDD        402/404         402+404
                                     (100/82)
              13C-OCDD               470/472         470+472
                                     (87/100)
---------------------------------------------------------------------------------------------------

GC/MS ANALYST:   GENE O.       ANALYSIS DATE:   4/22/88       DATA ENTRY REVIEWED:______________DATE:________

DATA ANALYST:    MIKE MOLLOY   ANALYSIS DATE:   4/25/88                 REVIEWED:______________DATE:________

DATA ENTRY:      MIKE MOLLOY   ENTRY DATE:      4/25/88                 REVIEWED:______________DATE:________
```

Figure A-2

898SOF3A

CALIBRATION CURVE RESPONSE FACTOR SUMMARY TABLE FOR C13-TETRA-OCTA CDD/CDF

DATA ANALYST:	GC/MS ANALYST:
MRI PROJECT NO.: 8985L09	INSTRUMENT:
DATE	MODE:

RESPONSE FACTOR (RRF) = (AREA(S)/AREA(IS))*(CONC.(IS)/CONC.(S))

DATE ANALYZED STANDARD CONC. DATA FILE NO. AREA R.I.S	AVERAGE RESPONSE FACTOR	% RSD (RRF)
13C-1,2,3,6,7,8-HxCDD	1.000	0.00
13C-2,3,7,8-TCDF		
13C-2,3,7,8-TCDD		
13C-1,2,3,7,8-PeCDD		
13C-1,2,3,4,6,7,8-HpCDD		
13C-1,2,3,7,8-PeCDF		
13C-1,2,3,4,7,8-HxCDF		
13C-OCDF		
13C-1,2,3,4-TCDD		
13C-1,2,3,7,8,9-HxCDD		
13C-OCDD		

Figure A-3

898SDF4A

RESPONSE FACTOR COMPARISON TABLE FOR C13-TETRA-OCTA CDD/CDF

DATA ANALYST:

GC/MS ANALYST:

MRI PROJECT NO.: 898SL09

INSTRUMENT:

DATE:

MODE:

RESPONSE FACTOR (RRF) = (AREA(S)/AREA(IS))*(CONC.(IS)/CONC.(S))

DATE ANALYZED STANDARD CONC. DATA FILE NO. AREA R.I.S	AVERAGE RESPONSE FACTOR	%RSD (RRF)	RANGE (RRF) -20%	RANGE (RRF) +20%
13C-1,2,3,6,7,8-HxCDD				
13C-2,3,7,8-TCDF				
13C-2,3,7,8-TCDD				
13C-1,2,3,7,8-PeCDD				
13C-1,2,3,4,6,7,8-HpCDD				
13C-1,2,3,7,8-PeCDF				
13C-1,2,3,4,7,8-HxCDF				
13C-OCDF				
13C-1,2,3,4-TCDD				
13C-1,2,3,7,8,9-HxCDD				
13C-OCDD				

Figure A-4

APPENDIX C

LOTUS SPREAD SHEETS FOR SAMPLES ANALYZED IN THE VALIDATION OF EMISSION TEST METHODS FOR PCDDs AND PCDFs

SECTION 5

Runs 4 Through 11

DFT4006X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691627X4

MRI SAMPLE NO: [redacted]LTER

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	2.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	NA
13C-1,2,3,7,8-HxCDF	5.00 NG
13C-OCDF	5.00 NG
13C-1,2,3,4-TCDD	4.70 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (7/24/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2644	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	244918			NA
1609	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.840	178350	0.64		51.3
1694	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.850	261642	1.44		115.5
2280	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.992	79212	0.82		65.2
2920	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.647	404894	6.39		63.9
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	4.275	NA	NA		NA
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.202	ND	0.00		0.0
NA	13C-OCDF	454/456 (87/100)	454+456	2.645	ND	0.00		0.0
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.798	ND	0.00		0.0
2671	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.280	8207	0.062		1.236
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.723			0.000	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.840			0.000	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.939			0.000	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	5.449			0.000	
NA	OCTA-CDF	442/444 (87/100)	442+444	2.624			0.000	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.498			0.000	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.782			0.000	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.350			0.000	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.406			0.000	
NA	OCTA-CDD	458/460 (87/100)	458+460	2.203			0.000	

GC/MS ANALYST:	K. THORNBURG	ANALYSIS DATE:	7/27/87	REVIEWED:		DATE:	5/22/87
DATA ANALYST:	M. MOLLOY	ANALYSIS DATE:	7/29/87	REVIEWED:		DATE:	
DATA ENTRY:	M. MOLLOY	ENTRY DATE:	7/29/87	REVIEWED:		DATE:	

DFT4008X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691H07X1

MRI SAMPLE NO: 4008 BACK 1/2

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	2.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	NA
13C-1,2,3,7,8-HxCDF	5.00 NG
13C-OCDF	5.00 NG
13C-1,2,3,4-TCDD	4.70 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/4/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2567	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	187685			NA
1502	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.330	106862	0.61		48.9
1581	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.834	186940	1.36		108.6
2179	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.932	58732	0.84		67.2
2851	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.478	242806	6.77		67.7
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.630	ND	NA		NA
2471	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	5.979	786108	5.4		108.3
3086	13C-OCDF	454/456 (87/100)	454+456	2.128	203001	3.9		78.6
1557	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.791	610464	2.3		48.5
2596	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.533	376361	3.4		68.4
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	0.000			ERR	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	0.000			ERR	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	0.000			ERR	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	0.000			ERR	
NA	OCTA-CDF	442/444 (87/100)	442+444	0.000			ERR	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	0.000			ERR	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	0.000			ERR	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	0.000			ERR	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	0.000			ERR	
NA	OCTA-CDD	458/460 (87/100)	458+460	0.000			ERR	

GC/MS ANALYST:	K. THORNBURG	ANALYSIS DATE:	8/7/87	REVIEWED:	DATE: 8/12/87
DATA ANALYST:	J. PALAUSKY	ANALYSIS DATE:	8/10/87	REVIEWED:	DATE:
DATA ENTRY:	J. PALAUSKY	ENTRY DATE:	8/10/87	REVIEWED:	DATE:

DFT4016X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691629X2

MRI SAMPLE NO: 4016 FILTER

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	2.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.20 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	NA
13C-1,2,3,7,8-HxCDF	5.00 NG
13C-OCDF	5.00 NG
13C-1,2,3,4-TCDD	4.70 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (7/29/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2573	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	129846			NA
1527	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.590	123355	0.92		76.4
1608	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.788	79109	0.85		68.1
2196	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.952	44536	0.90		72.1
2855	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.627	287168	8.83		88.3
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	NA		NA		NA
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.612	ND	0.00		0.0
NA	13C-OCDF	454/456 (87/100)	454+456	2.589	ND	0.00		0.0
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.629	ND	0.00		0.0
2610	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.276	11274	0.120		2.396
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	0.000			ERR	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	0.000			ERR	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	0.000			ERR	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	0.000			ERR	
NA	OCTA-CDF	442/444 (87/100)	442+444	0.000			ERR	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	0.000			ERR	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	0.000			ERR	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	0.000			ERR	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	0.000			ERR	
NA	OCTA-CDD	458/460 (87/100)	458+460	0.000			ERR	

GC/MS ANALYST:	T. SACK	ANALYSIS DATE:	7/29/87	REVIEWED: ✓	DATE: 5/22/57
DATA ANALYST:	M. MOLLOY	ANALYSIS DATE:	7/30/87	REVIEWED:	DATE:
DATA ENTRY:	M. MOLLOY	ENTRY DATE:	7/30/87	REVIEWED:	DATE:

DFT4018X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691H07X2

MRI SAMPLE NO: 4018 BACK 1/2

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	2.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	NA
13C-1,2,3,7,8-HxCDF	5.00 NG
13C-OCDF	5.00 NG
13C-1,2,3,4-TCDD	4.70 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/4/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2563	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	183536			NA
1496	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.330	140984	0.82		65.9
1575	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.834	166585	1.24		99.0
2173	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.932	60746	0.89		71.0
2849	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.478	324004	9.24		92.4
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.630	ND	NA		NA
2467	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	5.379	864216	4.5		89.2
3085	13C-OCDF	454/456 (87/100)	454+456	2.128	259641	3.8		75.3
1550	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.791	739991	3.1		65.9
2592	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.533	451936	3.1		61.5
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	0.000			ERR	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	0.000			ERR	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	0.000			ERR	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	0.000			ERR	
NA	OCTA-CDF	442/444 (87/100)	442+444	0.000			ERR	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	0.000			ERR	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	0.000			ERR	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	0.000			ERR	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	0.000			ERR	
NA	OCTA-CDD	458/460 (87/100)	458+460	0.000			ERR	

GC/MS ANALYST:	K. THORNBURG	ANALYSIS DATE:	8/7/87	REVIEWED:	DATE: 5/22/87
DATA ANALYST:	J. PALAUSKY	ANALYSIS DATE:	8/10/87	REVIEWED:	DATE:
DATA ENTRY:	J. PALAUSKY	ENTRY DATE:	8/10/87	REVIEWED:	DATE:

DFT5006X

SAMPLE-SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF HMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT (IS)/RF)

PROJECT NO: 8691107

GC/MS DATA FILE: 8691629X4

MRI SAMPLE NO: [redacted]TER

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	2.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.20 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	NA
13C-1,2,3,7,8-HxCDF	500 NG
13C-OCDF	500 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	500 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT (IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (7/29/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2564	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	113839			NA
1516	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.590	100451	0.85		71.0
1596	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.788	69156	0.85		67.9
2186	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.952	35617	0.82		65.8
2848	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.627	227050	7.96		79.6
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	NA		NA		NA
2472	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.612	3135	0.030		0.006
3082	13C-OCDF	454/456 (87/100)	454+456	2.589	13495	0.230		0.046
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.629	ND	0.000		0.000
2593	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.276	9852	0.132		0.026
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	0.000			ERR	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	0.000			ERR	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	0.000			ERR	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	0.000			ERR	
NA	OCTA-CDF	442/444 (87/100)	442+444	0.000			ERR	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	0.000			ERR	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	0.000			ERR	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	0.000			ERR	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	0.000			ERR	
NA	OCTA-CDD	458/460 (87/100)	458+460	0.000			ERR	

GC/MS ANALYST:	T. SACK	ANALYSIS DATE:	7/29/87	REVIEWED:	Lutes	DATE:	5/23/87
DATA ANALYST:	M. MOLLOY	ANALYSIS DATE:	7/30/87	REVIEWED:		DATE:	
DATA ENTRY:	M. MOLLOY	ENTRY DATE:	7/30/87	REVIEWED:		DATE:	

DFT5008R

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(RIS))*(AMT.(RIS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691H07X3

MRI SAMPLE NO: # 5008 DILUTION(1:50)

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	20.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	NA
13C-2,3,7,8-TCDD	NA
13C-1,2,3,7,8-PeCDD	NA
13C-1,2,3,4,6,7,8-HPCDD	NA

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	NA
13C-1,2,3,7,8-HxCDF	40.0 NG
13C-OCDF	40.0 NG
13C-1,2,3,4-TCDD	37.6 NG
13C-1,2,3,7,8,9-HxCDD	40.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(RIS))*AMT.(RIS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/4/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2566	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	171946			NA
NA	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.330	ND	0.00		ERR
NA	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.834	ND	0.00		ERR
NA	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.932	ND	0.00		ERR
NA	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.478	ND	0.00		ERR
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.392	ND	NA		NA
2471	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	2.859	1159536	47.17		117.9
3086	13C-OCDF	454/456 (87/100)	454+456	1.025	407098	46.21		115.5
1559	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	3.297	760668	26.84		71.4
2595	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	2.164	754484	40.55		101.4
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	0.000			ERR	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	0.000			ERR	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	0.000			ERR	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	0.000			ERR	
NA	OCTA-CDF	442/444 (87/100)	442+444	0.000			ERR	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	0.000			ERR	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	0.000			ERR	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	0.000			ERR	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	0.000			ERR	
NA	OCTA-CDD	458/460 (87/100)	458+460	0.000			ERR	

GC/MS ANALYST:	K. THORNBURG	ANALYSIS DATE:	8/7/87	REVIEWED:	DATE: 5/23/87
DATA ANALYST:	J. PALAUSKY	ANALYSIS DATE:	8/10/87	REVIEWED:	DATE:
DATA ENTRY:	J. PALAUSKY	ENTRY DATE:	8/10/87	REVIEWED:	DATE:

DFT5016X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 869162SX7

MRI SAMPLE NO: 5016 FILTER

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	2.5 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	1.20 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	NA
13C-1,2,3,7,8-HxCDF	500 NG
13C-OCDF	500 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	500 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (7/29/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2565	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	212522			NA
1518	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.590	160500	0.73		60.8
1597	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.788	109812	0.72		57.8
2187	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.952	65314	0.81		64.6
2849	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.627	429864	8.07		80.7
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	NA		NA		NA
2474	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.612	21252	0.107		0.021
3083	13C-OCDF	454/456 (87/100)	454+456	2.589	23512	0.211		0.042
1577	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.629	12333	0.086		0.018
2595	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.276	26185	0.186		0.037
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	0.000			ERR	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	0.000			ERR	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	0.000			ERR	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	0.000			ERR	
NA	OCTA-CDF	442/444 (87/100)	442+444	0.000			ERR	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	0.000			ERR	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	0.000			ERR	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	0.000			ERR	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	0.000			ERR	
NA	OCTA-CDD	458/460 (87/100)	458+460	0.000			ERR	

GC/MS ANALYST:	T. SACK	ANALYSIS DATE:	7/29/87	REVIEWED: J Cortes	DATE: 5/23/87
DATA ANALYST:	M. MOLLOY	ANALYSIS DATE:	7/30/87	REVIEWED:	DATE:
DATA ENTRY:	M. MOLLOY	ENTRY DATE:	7/30/87	REVIEWED:	DATE:

DFT5018R

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(RIS))*(AMT.(RIS)/RF)

PROJECT NO: 8691L07
GC/MS DATA FILE: 8691H07X4
MRI SAMPLE NO: 5018 DILUTION(1:50)

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	20.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	NA
13C-2,3,7,8-TCDD	NA
13C-1,2,3,7,8-PeCDD	NA
13C-1,2,3,4,6,7,8-HPCDD	NA

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	NA
13C-1,2,3,7,8-HxCDF	40.0 NG
13C-OCDF	40.0 NG
13C-1,2,3,4-TCDD	37.6 NG
13C-1,2,3,7,8,9-HxCDD	40.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(RIS))*AMT.(RIS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/4/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2564	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	167566			NA
NA	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.330	ND	0.00		ERR
NA	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.334	ND	0.00		ERR
NA	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.932	ND	0.00		ERR
NA	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.478	ND	0.00		ERR
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.392	ND	NA		NA
2468	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	2.859	721396	30.12		75.3
3085	13C-OCDF	454/456 (87/100)	454+456	1.025	232618	27.10		67.7
1550	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	3.297	511015	18.50		49.2
2594	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	2.164	375736	20.72		51.8
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	0.000			ERR	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	0.000			ERR	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	0.000			ERR	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	0.000			ERR	
NA	OCTA-CDF	442/444 (87/100)	442+444	0.000			ERR	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	0.000			ERR	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	0.000			ERR	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	0.000			ERR	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	0.000			ERR	
NA	OCTA-CDD	458/460 (87/100)	458+460	0.000			ERR	

GC/MS ANALYST: K. THORNBURG	ANALYSIS DATE: 8/7/87	REVIEWED:		DATE: 5/23/87
DATA ANALYST: J. PALAUSKY	ANALYSIS DATE: 8/10/87	REVIEWED:		DATE:
DATA ENTRY: J. PALAUSKY	ENTRY DATE: 8/10/87	REVIEWED:		DATE:

DFT6005X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F08X1

MRI SAMPLE NO: 6005 CYCLONE

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	5.00 NG
13C-1,2,3,7,8-HxCDF	5.00 NG
13C-OCDF	5.00 NG
13C-1,2,3,4-TCDD	4.70 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2675	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	404344			NA
1690	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	96368	1.08		86.7
1782	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	75971	1.22		97.4
2330	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	47992	1.22		98.0
2945	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	183773	9.45		94.5
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	ND	0.00		0.0
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		0.0
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	ND	0.00		0.0
NA	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	ND	0.00		0.0
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	3060781		16.955	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	1031567		8.573	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	357827		3.194	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	105592		1.464	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	11719		0.359	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	223125		1.687	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	194410		2.070	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	177751		2.325	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	88913		2.229	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	5374	ND<	0.177	

GC/MS ANALYST: R. ROBSON ANALYSIS DATE: 6/8/87

DATA ANALYST: T. GRACE ANALYSIS DATE: 6/10/87

DATA ENTRY: P. PERKINS ENTRY DATE: 6/11/87

REVIEWED: C. Perkins DATE: 9/4/87

REVIEWED: Mike Frolley DATE: 9/8/87

REVIEWED:________________ DATE:________

DFT6009J

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691E28X9

MRI SAMPLE NO: 6006-09

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	5.00 NG
13C-1,2,3,7,8-HxCDF	5.00 NG
13C-OCDF	5.00 NG
13C-1,2,3,4-TCDD	4.70 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2676	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	423324			NA
1682	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	108109	1.16		92.9
1790	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	NA*	0.00		0.0
2329	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	55446	1.35		108.1
2945	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	191147	9.39		93.9
2196	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	688292	4.54		90.8
2591	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	174598	1.49		29.8
3184	13C-OCDF	454/456 (87/100)	454+456	1.972	43185	1.15		22.9
1749	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.185	128688	1.26		26.7
2705	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	78133	0.99		19.9
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	11460313		56.588	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	4684976		33.700	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	1443366		12.395	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	359934		4.797	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	28981		0.855	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	1.517	349863		2.667	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	191648		1.766	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	266989		3.358	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	187619		4.523	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	87643		2.777	

* = UNABLE TO QUANTITATE DUE TO INTERFERENCE (USED 13C-2,3,7,8-TCDF FOR QUANTITATION)

GC/MS ANALYST:	D. MILLS	ANALYSIS DATE:	5/28/87	REVIEWED:	DATE: 9/9/87
DATA ANALYST:	T. GRACE	ANALYSIS DATE:	6/2/87	REVIEWED:	DATE: 9/8/87
DATA ENTRY:	P. PERKINS	ENTRY DATE:	7/27/87	REVIEWED:	DATE:

DFT6010X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F01X1

MRI SAMPLE NO: 6010 COMO

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	5.00 NG
13C-1,2,3,7,8-HxCDF	5.00 NG
13C-OCDF	5.00 NG
13C-1,2,3,4-TCDD	4.70 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2707	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	311192			NA
1718	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	76152	1.11		89.0
1809	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	58118	1.21		96.8
2363	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	34000	1.13		90.2
2977	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	121863	8.14		81.4
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	ND	0.00		0.0
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		0.0
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	ND	0.00		0.0
NA	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	ND	0.00		0.0
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	191263		1.341	
NA	TOTAL-PENTA-CDF	338/340 (51/100)	338+340	3.134	52195		0.612	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	8655		0.116	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	2526	ND<	0.053	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.249	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	11579	ND<	0.114	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	13197	ND<	0.198	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	27744	ND<	0.547	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	5025	ND<	0.190	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	5374	ND<	0.267	

GC/MS ANALYST: R. ROBSON   ANALYSIS DATE: 6/1/87   REVIEWED: P. Perkins   DATE: 9/4/87

DATA ANALYST: T. GRACE   ANALYSIS DATE: 6/5/87   REVIEWED: Mike Molloy   DATE: 9/8/87

DATA ENTRY: P. PERKINS   ENTRY DATE: 6/12/87   REVIEWED: ______   DATE: ______

DFT6015X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F08X2

MRI SAMPLE NO: 6015 CYCLONE

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	5.00 NG
13C-1,2,3,7,8-HxCDF	5.00 NG
13C-OCDF	5.00 NG
13C-1,2,3,4-TCDD	4.70 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2677	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	279240			NA
1693	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	42990	0.70		56.0
1781	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	23092	0.54		42.9
2334	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	24560	0.91		72.6
2948	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	50586	3.77		37.7
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	ND	0.00		0.0
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		0.0
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	ND	0.00		0.0
NA	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	ND	0.00		0.0
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	440823		5.474	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	94379		1.533	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	57778		1.873	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	14369		0.724	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	1074	ND<	0.120	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	24522		0.610	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	3299	ND<	0.069	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	26740		1.271	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	5025	ND<	0.459	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	2687	ND<	0.322	

GC/MS ANALYST: R. ROBSON   ANALYSIS DATE: 6/8/87   Entry REVIEWED: ______ DATE: 9/4/87

DATA ANALYST: T. GRACE   ANALYSIS DATE: 6/10/87   REVIEWED: Mike Molloy DATE: 9/8/87

DATA ENTRY: P. PERKINS   ENTRY DATE: 6/11/87   REVIEWED: ______ DATE: ______

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691E28X10

MRI SAMPLE NO: 6016-19

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	5.00 NG
13C-OCDF	5.00 NG
13C-1,2,3,4-TCDD	4.70 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2679	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	479250			NA
1693	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	137358	1.30		104.3
1786	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	133578	1.81		144.5
2335	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	53201	1.15		91.6
2948	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	195155	8.47		84.7
2203	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	7940880	54.61		109.2
2594	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	115420	0.97		19.3
3186	13C-OCDF	454/456 (87/100)	454+456	1.972	11766	0.31		6.1
1758	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	100770	0.56		11.9
2707	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	51085	0.64		12.7
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	9773518		37.983	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	3744338		28.071	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	1053536		8.854	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	213720		2.790	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	10614		0.307	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	305959		1.316	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	223960		2.151	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	238711		2.941	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	138342		3.266	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	56736		1.761	

GC/MS ANALYST: D. MILLS   ANALYSIS DATE: 5/28/87   REVIEWED: [illegible]   DATE: 9/4/87

DATA ANALYST: T. GRACE   ANALYSIS DATE: 6/1/87   REVIEWED: Mike [illegible]   DATE: 9/8/87

DATA ENTRY: P. PERKINS   ENTRY DATE: 6/2/87   REVIEWED: ____________   DATE: ______

DFT6020X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07	**RECOVERY INTERNAL STANDARD**		**FIELD METHOD INTERNAL STANDARDS**	
GC/MS DATA FILE: 8691F01X2	13C-1,2,3,6,7,8-HxCDD	10.0 NG	13C-1,2,3,7,8-PeCDF	5.00 NG
MRI SAMPLE NO: 6020 COND	**LAB METHOD INTERNAL STANDARDS**		13C-1,2,3,7,8-HxCDF	5.00 NG
	13C-2,3,7,8-TCDF	1.25 NG	13C-OCDF	5.00 NG
	13C-2,3,7,8-TCDD	1.25 NG	13C-1,2,3,4-TCDD	4.70 NG
	13C-1,2,3,7,8-PeCDD	1.25 NG	13C-1,2,3,7,8,9-HxCDD	5.00 NG
	13C-1,2,3,4,6,7,8-HPCDD	10.0 NG		

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2711	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	318346			NA
1724	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	52616	0.75		60.1
1817	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	36538	0.74		59.5
2368	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	19682	0.64		51.0
2981	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	97790	6.39		63.9
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	ND	0.00		0.0
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		0.0
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	ND	0.00		0.0
NA	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	ND	0.00		0.0
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	87673		0.889	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	28936		0.586	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	5549	ND<	0.093	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	2526	ND<	0.066	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.310	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	11579	ND<	0.182	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	13197	ND<	0.343	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	5549	ND<	0.136	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	2513	ND<	0.118	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	5374	ND<	0.333	

GC/MS ANALYST: R. ROBSON	ANALYSIS DATE: 6/1/87	REVIEWED: P. Perkins	DATE: 9/4/87
DATA ANALYST: T. GRACE	ANALYSIS DATE: 6/8/87	REVIEWED: Mike Molloy	DATE: 9/8/87
DATA ENTRY: P. PERKINS	ENTRY DATE: 6/15/87	REVIEWED:	DATE:

DFT6025X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F08X3

MRI SAMPLE NO: 6025 CYCLONE

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2675	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	405972			NA
1686	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	88507	0.99		79.3
1777	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	69776	1.11		89.1
2328	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	43466	1.10		88.4
2946	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	161937	8.30		83.0
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
2589	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	45655	0.46		0.9
3185	13C-OCDF	454/456 (87/100)	454+456	1.972	9017	0.28		0.6
1752	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	59101	0.63		1.3
2703	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	21565	0.32		0.6
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	2913923		17.575	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	934916		8.579	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	251671		2.549	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	56547		0.890	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	2073		0.072	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	99660		0.821	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	85211		1.002	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	98735		1.466	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	52090		1.482	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	20381		0.762	

GC/MS ANALYST: R. ROBSON   ANALYSIS DATE: 6/8/87

DATA ANALYST: T. GRACE   ANALYSIS DATE: 6/10/87

DATA ENTRY: P. PERKINS   ENTRY DATE: 6/11/87

Entry REVIEWED: P. Perkins DATE: 9/4/87

REVIEWED: Mike Molloy DATE: 9/8/87

REVIEWED: ________ DATE: ________

DFT6029X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691E29X6

MRI SAMPLE NO: 6026-29

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2681	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	385424			NA
1697	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	120475	1.42		113.7
1789	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	85709	1.44		115.3
2337	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	53172	1.42		113.8
2951	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	179971	9.71		97.1
2206	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	7279600	50.09		100.2
2595	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	1599412	14.52		29.0
3188	13C-OCDF	454/456 (87/100)	454+456	1.972	479897	13.52		27.0
1762	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	1506568	13.01		27.7
2708	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	918176	11.06		22.1
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	22998063		101.902	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	8631887		64.747	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	2664661		24.284	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	645064		9.131	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	53376		1.672	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	985318		6.605	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	835553		8.030	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	529845		7.078	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	297063		7.506	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	138886		4.674	

GC/MS ANALYST: D. MILLS ANALYSIS DATE: 5/29/87

DATA ANALYST: T. GRACE ANALYSIS DATE: 6/3/87

DATA ENTRY: P. PERKINS ENTRY DATE: 6/3/87

Entry REVIEWED: P. Perkins DATE: 9/8/87

REVIEWED: Mike Molloy DATE: 9/8/87

REVIEWED: ____________ DATE: ________

DFT60290

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691E29X7

MRI SAMPLE NO: 6026-29 DUP

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2670	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	461622			NA
1677	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	134010	1.32		105.6
1768	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	82132	1.15		92.2
2322	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	56946	1.27		101.8
2942	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	222184	10.01		100.1
2190	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	8021840	51.54		103.1
2594	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	1935900	13.50		27.0
3181	13C-OCDF	454/456 (87/100)	454+456	1.972	667613	15.23		30.5
1742	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	1563120	14.09		30.0
2698	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	967136	10.59		21.2
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	22361277		89.073	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	8436323		59.086	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	2868873		21.178	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	777570		8.915	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	73541		1.866	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	960607		6.720	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	820499		7.363	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	723788		7.832	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	375737		7.792	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	184804		5.038	

GC/MS ANALYST:	D. MILLS	ANALYSIS DATE:	5/29/87	REVIEWED:	L. Perkins	DATE:	9/4/87
DATA ANALYST:	T. GRACE	ANALYSIS DATE:	6/3/87	REVIEWED:	Mike Molloy	DATE:	9/8/87
DATA ENTRY:	P. PERKINS	ENTRY DATE:	6/4/87	REVIEWED:		DATE:	

DFT6030X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F01X3

MRI SAMPLE NO: 6030 COND

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2708	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	345816			NA
1719	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	85113	1.12		89.6
1811	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	57328	1.07		85.9
2364	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	37605	1.12		89.7
2978	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	121041	7.28		72.8
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
2624	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	12927	0.17		0.3
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		0.0
1785	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	9519	0.12		0.3
2735	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	13607	0.27		0.5
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	103153		0.647	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	88671		0.940	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	10011		0.136	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	2053		0.043	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.250	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	5789	ND<	0.058	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	13197	ND<	0.179	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	11098	ND<	0.220	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	5025	ND<	0.191	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	1580	ND<	0.079	

GC/MS ANALYST: R. ROBSON   ANALYSIS DATE: 6/1/87   REVIEWED: ______ DATE: 9/4/87

DATA ANALYST: T. GRACE   ANALYSIS DATE: 6/9/87   REVIEWED: Mike Molloy DATE: 9/8/87

DATA ENTRY: P. PERKINS   ENTRY DATE: 6/15/87   REVIEWED: ______ DATE: ______

DFT60300

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07
GC/MS DATA FILE: 8691F01X4
MRI SAMPLE NO: 6030 COND DUP

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2710	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	331044			NA
1720	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	76554	1.05		84.2
1812	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	62880	1.23		98.5
2365	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	35351	1.10		88.1
2979	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	122221	7.68		76.8
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
2625	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	13850	0.19		0.4
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		0.0
1788	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	7671	0.09		0.2
2739	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	14123	0.28		0.6
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	115915		0.808	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	50392		0.569	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	9726		0.131	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	5051	ND<	0.105	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.248	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	28947	ND<	0.264	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	3299	ND<	0.048	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	11098	ND<	0.218	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	5025	ND<	0.189	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	1580	ND<	0.078	

GC/MS ANALYST: R. ROBSON ANALYSIS DATE: 6/1/87 REVIEWED: C. Perkins DATE: 9/4/87
DATA ANALYST: T. GRACE ANALYSIS DATE: 6/8/87 REVIEWED: Mike Molloy DATE: 9/8/87
DATA ENTRY: P. PERKINS ENTRY DATE: 6/15/87 REVIEWED:________ DATE:________

DFT6035X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F10X1

MRI SAMPLE NO: 6035 CYCLONE

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.50 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.50 NG
13C-1,2,3,4,6,7,8-HPCDD	20.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	500 NG
13C-1,2,3,7,8-HxCDF	500 NG
13C-OCDF	500 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	500 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2663	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	622936			NA
1684	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	242636	1.77		70.9
1774	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	177456	1.85		73.8
2320	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	134536	2.23		89.1
2934	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	616080	20.57		102.8
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
2578	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	1424284	7.55		1.5
3174	13C-OCDF	454/456 (87/100)	454+456	1.972	425462	7.00		1.4
1748	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	1731952	14.45		3.1
2691	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	568622	4.49		0.9
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	9968265		43.861	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	3608907		21.398	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	1207721		6.430	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	279801		2.314	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	21092		0.386	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	583396		3.778	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	495449		3.764	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	262334		2.047	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	222962		3.335	
3166	OCTA-CDD	458/460 (87/100)	458+460	1.651	80669		1.586	

GC/MS ANALYST: M. WICKHAM
ANALYSIS DATE: 6-10-87
Entry REVIEWED: ________ DATE: 9/8/87

DATA ANALYST: T. GRACE
ANALYSIS DATE: 6-16-87
REVIEWED: Mike Molloy DATE: 9/8/87

DATA ENTRY: M. WHITACRE
ENTRY DATE: 6-16-87
REVIEWED: ________ DATE: ________

DF6039DR

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF HMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(RIS))*(AMT.(RIS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F04XS

MRI SAMPLE NO: 6036-39 DF(1-50)

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.2 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	NA
13C-2,3,7,8-TCDD	NA
13C-1,2,3,7,8-PeCDD	NA
13C-1,2,3,4,6,7,8-HPCDD	NA

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	10.0 NG
13C-1,2,3,7,8-HxCDF	10.0 NG
13C-OCDF	10.0 NG
13C-1,2,3,4-TCDD	9.40 NG
13C-1,2,3,7,8,9-HxCDD	10.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(RIS))*AMT.(RIS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2680	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	241177			NA
NA	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198		NA		NA
NA	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543		NA		NA
NA	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969		NA		NA
NA	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.491		NA		NA
2206	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.319	940328	11.98		119.8
2596	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	2.950	174692	2.50		25.0
3190	13C-OCDF	454/456 (87/100)	454+456	0.353	36891	1.64		16.4
1761	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.589	259687	4.24		45.1
2709	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	1.978	71917	1.54		15.4
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342			NA	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134			NA	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097			NA	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925			NA	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774			NA	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176			NA	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446			NA	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160			NA	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170			NA	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651			NA	

GC/MS ANALYST:	R. ROBSON	ANALYSIS DATE:	6/4/87	Entry REVIEWED: E. Perkins	DATE: 8/14/87
DATA ANALYST:	M. MOLLOY	ANALYSIS DATE:	6/17/87	REVIEWED:	DATE: 3/17/89
DATA ENTRY:	P. PERKINS	ENTRY DATE:	7/24/87	REVIEWED:	DATE:

DF60390F

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F04XS

MRI SAMPLE NO: 6036-39 DF(1-50)

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARD RATIO

13C-2,3,7,8-TCDF	NA
13C-2,3,7,8-TCDD	0.00180
13C-1,2,3,7,8-PeCDD	0.00139
13C-1,2,3,4,6,7,8-HPCDD	0.00442

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	10.0 NG
13C-1,2,3,7,8-HxCDF	10.0 NG
13C-OCDF	10.0 NG
13C-1,2,3,4-TCDD	9.40 NG
13C-1,2,3,7,8,9-HxCDD	10.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2680	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	241177			NA
NA	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198		NA	NA	NA
NA	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543		NA	0.025	NA
NA	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969		NA	0.025	NA
NA	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481		NA	0.200	NA
2206	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	940328	20.52		205.2
2596	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	174692	5.35		53.5
3190	13C-OCDF	454/456 (87/100)	454+456	1.972	36891	3.51		35.1
1761	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	259687	8.85		94.2
2709	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	71917	3.28		32.8
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342			NA	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134			NA	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097			NA	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925			NA	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774			NA	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176			NA	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446			NA	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160			NA	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170			NA	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651			NA	

GC/MS ANALYST:	RICK R.	ANALYSIS DATE:	6/4/87	REVIEWED:	DATE: 9/4/87
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	6/17/87	REVIEWED:	DATE: 3/20/89
DATA ENTRY:	MIKE MOLLOY	ENTRY DATE:	6/17/87	REVIEWED:	DATE:

DFT6039X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691E30X4

MRI SAMPLE NO: 6036-39

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	500.0 NG
13C-1,2,3,7,8-HxCDF	500.0 NG
13C-OCDF	500.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,9,9-HxCDD	500.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2681	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	667268			NA
1695	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	312116	2.13		170.2
1796	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	60045	0.58		46.6
2336	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	46408	0.72		57.4
2950	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	147386	4.59		45.9
2207	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	78989700	622.73		124.5 *
2596	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	21517550	238.51		47.7 *
3187	13C-OCDF	454/456 (87/100)	454+456	1.972	5613840	193.12		38.6 *
1761	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	21386870	263.62		56.1 *
2708	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	9697810	160.10		32.0 *
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	22446237		38.390	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	9048055		77.761	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	2854959		31.770	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	704074		12.170	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	61678		2.359	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	822910		7.874	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	739204		8.140	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	625013		10.195	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	375541		11.741	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	5374	ND<	0.221	

* = SURROGATE AREA OUT OF STANDARD CALIBRATION RANGE(SEE DILUTION ANALYZED 6/4/87)

GC/MS ANALYST: R. ROBSON ANALYSIS DATE: 5/30/87 Entry REVIEWED: ______ DATE: 9/8/87

DATA ANALYST: C. CASSADY ANALYSIS DATE: 6/3/87 REVIEWED: ______ DATE: 9/8/87

DATA ENTRY: P. PERKINS ENTRY DATE: 6/3/87 REVIEWED: ______ DATE: ______

DFT6040X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF HRMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F01X5

MRI SAMPLE NO: 6040 COND

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	500.0 NG
13C-1,2,3,7,8-HxCDF	500.0 NG
13C-OCDF	500.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	500.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2705	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	383964			NA
1716	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	76427	0.91		72.4
1807	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	50144	0.85		67.7
2361	13C-1,2,3,7,8-PeCDD	366/368 (51/100)	368	0.969	37928	1.02		81.5
2974	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.491	144597	7.83		78.3
2229	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	33420	0.32		0.1
2620	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	82626	0.93		0.2
3219	13C-OCDF	454/456 (87/100)	454+456	1.372	6048	0.21		0.04
1780	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	29894	0.44		0.1
2732	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	37922	0.64		0.1
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	4875		0.034	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	15754		0.166	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	4121		0.047	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	2525	ND<	0.044	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.209	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	5789	ND<	0.066	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	6598	ND<	0.089	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	5549	ND<	0.092	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	2513	ND<	0.080	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	537	ND<	0.022	

GC/MS ANALYST:	D. MILLS	ANALYSIS DATE:	6/1/87	Entry REVIEWED:	L. Baker	DATE:	9/8/87
DATA ANALYST:	T. GRACE	ANALYSIS DATE:	6/9/87	REVIEWED:	Mike Molloy	DATE:	9/8/87
DATA ENTRY:	P. PERKINS	ENTRY DATE:	6/15/87	REVIEWED:		DATE:	

DFT6040D

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F01X6

MRI SAMPLE NO: 6040 COND DUP

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	500.0 NG
13C-1,2,3,7,8-HxCDF	500.0 NG
13C-OCDF	500.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	500.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2700	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	384682			NA
1689	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	84748	1.00		80.2
1779	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	52866	0.89		71.2
2349	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	38080	1.02		81.7
2973	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.491	143236	7.74		77.4
2215	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	32244	0.31		0.1
2614	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	83472	0.95		0.2
3216	13C-OCDF	454/456 (87/100)	454+456	1.972	5615	0.1988		0.04
1754	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	27833	0.39		0.1
2728	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	38794	0.66		0.1
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	2917	ND<	0.018	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	14022		0.147	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	3089		0.035	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	2526	ND<	0.045	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.211	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	28947	ND<	0.315	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	6598	ND<	0.089	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	5025	ND<	0.084	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	502	ND<	0.016	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	1074	ND<	0.045	

GC/MS ANALYST: D. MILLS ANALYSIS DATE: 6/1/87 Entry REVIEWED: DATE: 9/4/87

DATA ANALYST: T. GRACE ANALYSIS DATE: 6/9/87 REVIEWED: DATE: 9/8/87

DATA ENTRY: P. PERKINS ENTRY DATE: 6/16/87 REVIEWED:________ DATE:______

DFT6049P

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07
GC/MS DATA FILE: 8691E28X8
MRI SAMPLE NO: 6045-49 BT

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.50 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.50 NG
13C-1,2,3,4,6,7,8-HPCDD	20.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	NA
13C-1,2,3,7,8-HxCDF	NA
13C-OCDF	NA
13C-1,2,3,4-TCDD	NA
13C-1,2,3,7,8,9-HxCDD	NA

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2680	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	468092			NA
1695	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	204285.	1.99		79.4
1787	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	158252	2.19		87.6
	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	NA*	0.00		0.0
2948	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	413372	18.37		91.8
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	NA	NA		NA
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	NA	NA		NA
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	NA	NA		NA
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	NA	NA		NA
NA	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	NA	NA		NA
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	6652		0.035	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.005	13991		0.057	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	10741		0.085	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	3197		0.039	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.147	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	42127		0.306	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.343	8669		0.058	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	21368		0.249	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	69137		1.541	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	86965		2.548	

* = UNABLE TO QUANTITATE DUE TO INTERFERENCE (USED 13C-1,2,3,7,8-TCDF/TCDD FOR QUANTITATION)

GC/MS ANALYST:	D. MILLS	ANALYSIS DATE:	5/28/87	REVIEWED: P. Perkins	DATE: 8/10/87
DATA ANALYST:	T. GRACE	ANALYSIS DATE:	6/2/87	REVIEWED: Mike Kelly	DATE: 9/8/87
DATA ENTRY:	P. PERKINS	ENTRY DATE:	6/5/87	REVIEWED:	DATE:

DFT7005X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F10X2

MRI SAMPLE NO: 7005 CYCLONE

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	5.00 NG
13C-1,2,3,7,8-HxCDF	5.00 NG
13C-OCDF	5.00 NG
13C-1,2,3,4-TCDD	4.70 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2665	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	413544			NA
1688	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	89131	0.98		78.4
1776	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	60608	0.95		76.0
2322	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	47751	1.19		95.3
2935	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	194350	9.77		97.7
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	ND	0.00		0.0
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		0.0
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	ND	0.00		0.0
2693	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	14300	0.18		3.6
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	1473728		8.826	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	717147		5.990	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	171249		1.445	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	58851		0.771	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	3700		0.107	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.175	57948		0.549	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	48823		0.522	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	74824		0.926	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	63166		1.498	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	30415		0.948	

GC/MS ANALYST: M. WICKHAM ANALYSIS DATE: 6/10/87

DATA ANALYST: T. GRACE ANALYSIS DATE: 6/15/87

DATA ENTRY: P. PERKINS ENTRY DATE: 6/16/87

REVIEWED: DATE: 9/4/87

REVIEWED: Mike Molloy DATE: 9/8/87

REVIEWED:________ DATE:______

DFT7006X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF HRMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691E21X2

MRI SAMPLE NO: 7006 FILTER

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	5.00 NG
13C-1,2,3,7,8-HxCDF	5.00 NG
13C-OCDF	5.00 NG
13C-1,2,3,4-TCDD	4.70 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/13/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2719	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	576136			NA
1753	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.646	255784	1.68		134.2
1847	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.703	142732	1.45		116.4
2381	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.041	98820	1.65		131.8
2987	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.508	247696	8.46		84.6
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.575	ND	0.00		0.0
2635	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.369	206891	1.31		26.2
3230	13C-OCDF	454/456 (87/100)	454+456	2.224	19775	0.36		7.2
1820	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.792	165072	0.81		17.2
2749	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.109	72385	0.71		14.2
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.548	21629376		41.468	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.600	9246958		32.495	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.378	3426009		21.686	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	4.319	987735		9.234	
NA	OCTA-CDF	442/444 (87/100)	442+444	2.054	15880		0.312	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.395	1037590		3.795	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.767	1060971		4.850	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.453	941388		8.535	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.255	626894		11.223	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.733	276235		6.435	

GC/MS ANALYST: R. ROBSON   ANALYSIS DATE: 5/21/87

DATA ANALYST: J. PALAUSKY   ANALYSIS DATE: 5/27/87

DATA ENTRY: P. PERKINS   ENTRY DATE: 5/28/87

Entry REVIEWED: P. Perkins DATE: 9/4/87

REVIEWED: Mike Malloy DATE: 9/8/87

REVIEWED:______________ DATE:________

DFT7007X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691E20X2

MRI SAMPLE NO: 7007 FRONT 1/2

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	5.00 NG
13C-1,2,3,7,8-HxCDF	5.00 NG
13C-OCDF	5.00 NG
13C-1,2,3,4-TCDD	4.70 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/13/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2708	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1373350			NA
1742	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.646	159626	0.44		35.1
1834	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.703	114020	0.49		39.0
2370	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.041	110326	0.77		61.7
2978	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.508	428360	6.14		61.4
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.575	ND	0.00		0.0
2625	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.369	111158	0.41		8.1
3220	13C-OCDF	454/456 (87/100)	454+456	2.224	21932	0.23		4.60
1808	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.792	46750	0.29		6.08
2735	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.109	50892	0.29		5.8
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.548	6585200		20.240	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.600	3173349		9.989	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.379	1173862		4.296	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	4.319	313497		1.695	
NA	OCTA-CDF	442/444 (87/100)	442+444	2.054	19918		0.226	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.395	408464		1.870	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.767	510329		2.090	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.453	621770		3.259	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.255	358181		3.708	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.733	120564		1.624	

GC/MS ANALYST: R. ROBSON ANALYSIS DATE: 5/20/87

DATA ANALYST: M. MOLLOY ANALYSIS DATE: 5/22/87

DATA ENTRY: P. PERKINS ENTRY DATE: 5/26/87

REVIEWED: ______ DATE: 9/4/87

REVIEWED: J Bates DATE: 3/20/89

REVIEWED: ______ DATE: ______

DFT7008X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691E27X2

MRI SAMPLE NO: 7008 BACK 1/2

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	5.00 NG
13C-1,2,3,7,8-HxCDF	5.00 NG
13C-OCDF	5.00 NG
13C-1,2,3,4-TCDD	4.70 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2684	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	177663			NA
1701	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	12266	0.31		25.1
1794	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	9148	0.33		26.7
2342	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	9584	0.56		44.5
2953	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	38429	4.50		45.0
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	ND	0.00		0.0
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		0.0
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	ND	0.00		0.0
2713	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	2207	0.14		2.8
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	980786		42.683	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	395611		16.463	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	80718		3.445	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	14381		0.953	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	1274	ND<	0.187	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	20369		1.279	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	3299	ND<	0.176	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	29646		1.855	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	16742		2.007	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	2354		0.371	

GC/MS ANALYST: R. ROBSON ANALYSIS DATE: 5/27/87

DATA ANALYST: T. GRACE ANALYSIS DATE: 5/31/87

DATA ENTRY: P. PERKINS ENTRY DATE: 6/1/87

Entry REVIEWED: ______ DATE: 9/4/87

REVIEWED: Mike Mollry DATE: 9/8/87

REVIEWED: ______ DATE: ______

DFT7009X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07
GC/MS DATA FILE: 8691E28X1
MRI SAMPLE NO: 7009 XAD

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	5.00 NG
13C-1,2,3,7,8-HxCDF	5.00 NG
13C-OCDF	5.00 NG
13C-1,2,3,4-TCDD	4.70 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2683	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	543976			NA
1697	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	125506	1.05		84.0
1789	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	94599	1.13		90.2
2338	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	60873	1.15		92.3
2951	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.491	243394	9.31		93.1
2208	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	813576	4.89		97.8
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	ND	0.00		0.0
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		0.0
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	ND	0.00		0.0
NA	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	ND	0.00		0.0
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	1295213		5.509	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	351558		2.303	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	68906		0.464	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	10979		0.115	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.124	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	28737		0.175	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	6598	ND<	0.055	
NA	TOTAL-HEXA-CDD	390/392 (100/92)	390+392	4.160	5549	ND<	0.055	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	6970		0.132	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	4116		0.102	

GC/MS ANALYST: R. ROBSON
ANALYSIS DATE: 5/28/87
DATA ANALYST: T. GRACE
ANALYSIS DATE: 5/29/87
DATA ENTRY: P. PERKINS
ENTRY DATE: 6/1/87

REVIEWED: C. CASSADY DATE: 6/1/87
Entry REVIEWED: P. Perkins DATE: 9/18/87
REVIEWED:__________ DATE:______

DFT7010X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F01X7

MRI SAMPLE NO: 7010 COND

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	5.00 NG
13C-1,2,3,7,8-HxCDF	5.00 NG
13C-OCDF	5.00 NG
13C-1,2,3,4-TCDD	4.70 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE - (NG)	SURROGATE RECOVERY (%)
2708	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	416871			NA
1723	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	86409	0.94		75.4
1814	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	59221	0.92		73.6
2365	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.959	41814	1.03		82.8
2978	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	141850	7.08		70.8
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	ND	0.00		0.0
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		0.0
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	ND	0.00		0.0
2737	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	6875	0.12		2.4
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	2917	ND<	0.018	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	1980	ND<	0.019	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	2774	ND<	0.032	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	2526	ND<	0.045	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.214	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	11579	ND<	0.112	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	6598	ND<	0.081	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	5549	ND<	0.094	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	2513	ND<	0.082	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	5374	ND<	0.229	

GC/MS ANALYST: D. MILLS ANALYSIS DATE: 6/1/87

DATA ANALYST: T. GRACE ANALYSIS DATE: 6/9/87

DATA ENTRY: P. PERKINS ENTRY DATE: 6/16/87

Entry REVIEWED: P Perkins DATE: 9/6/87

REVIEWED: Mike Molloy DATE: 9/8/87

REVIEWED:________________ DATE:_______

DFT7015X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F09X1

MRI SAMPLE NO: 7015 CYCLONE

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2674	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	594460			NA
1686	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	144480	1.11		88.4
1775	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	104888	1.14		91.5
2328	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	84617	1.47		117.5
2944	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	390732	13.67		136.7
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
2588	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	216390	0.90		1.8
3185	13C-OCDF	454/456 (87/100)	454+456	1.972	66164	0.86		1.7
1750	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	203446	1.44		3.1
2701	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	97277	0.61		1.2
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	4089211		15.108	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	1683112		7.933	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	599342		2.516	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	172506		1.125	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	15401		0.222	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	175027		0.959	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	176722		1.067	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	222864		1.371	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	184281		2.173	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	92957		1.441	

GC/MS ANALYST:	R. ROBSON	ANALYSIS DATE:	6-9-87	REVIEWED:	DATE: 9/4/87
DATA ANALYST:	T. GRACE	ANALYSIS DATE:	6-16-87	REVIEWED: Mike	DATE: 9/3/87
DATA ENTRY:	M. WHITACRE	ENTRY DATE:	6-16-87	REVIEWED:	DATE:

DFT7019X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691E29X8

MRI SAMPLE NO: 7016-19

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2675	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	463874			NA
1681	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	119884	1.18		94.0
1772	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	58608	0.82		65.5
2327	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	36430	0.81		64.8
2946	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.491	203522	9.12		91.2
2195	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	4494950	45.14		90.3
2589	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	741512	5.95		11.9
3185	13C-OCDF	454/456 (87/100)	454+456	1.972	359645	8.96		17.9
1746	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	1278048	16.14		34.3
2702	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	695843	8.32		16.6
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	7851650		34.961	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	2829566		30.978	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	965560		7.781	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	357638		4.477	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	52510		1.454	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	469646		4.604	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	310837		4.360	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	452952		5.351	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	411766		9.323	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	242948		7.230	

GC/MS ANALYST:	D. MILLS	ANALYSIS DATE:	5/29/87	Entry REVIEWED:	DATE: 9/8/87
DATA ANALYST:	T. GRACE	ANALYSIS DATE:	6/3/87	REVIEWED: Mike Molloy	DATE: 9/8/87
DATA ENTRY:	P. PERKINS	ENTRY DATE:	6/4/87	REVIEWED:	DATE:

DFT7019D

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691E29X9

MRI SAMPLE NO: 7016-19 DUP

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2679	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	430692			NA
1696	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	108170	1.14		91.4
1787	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	56950	0.86		68.5
2334	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	40390	0.97		77.4
2948	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	191973	9.27		92.7
2203	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	4267960	38.66		77.3
2593	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	696868	5.93		11.9
3186	13C-OCDF	454/456 (87/100)	454+456	1.972	328988	8.69		17.4
1760	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	1245752	16.19		34.4
2705	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	622894	7.39		15.8
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	7532828		37.174	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	2816910		27.816	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	942801		8.055	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	329623		4.374	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	45380		1.332	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	433779		4.376	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	357879		4.528	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	410353		5.139	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	368431		8.843	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	212510		6.704	

GC/MS ANALYST: D. MILLS   ANALYSIS DATE: 5/29/87   Entry REVIEWED: P. Perkins DATE: 9/8/87

DATA ANALYST: T. GRACE   ANALYSIS DATE: 6/3/87   REVIEWED: Mike Molloy DATE: 9/3/87

DATA ENTRY: P. PERKINS   ENTRY DATE: 6/4/87   REVIEWED: ____________ DATE: ________

DFT7020X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F01X8

MRI SAMPLE NO: 7020 COND

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2700	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	447190			NA
1690	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	101596	1.03		82.7
1781	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	68514	0.99		79.4
2349	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	55043	1.27		101.6
2973	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	195500	9.09		90.9
2214	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	250664	1.73		3.5
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	ND	0.00		0.0
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		0.0
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	ND	0.00		0.0
NA	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	ND	0.00		0.0
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	2917	ND<	0.015	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	3299	ND<	0.024	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	2774	ND<	0.023	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	2526	ND<	0.033	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.155	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	11579	ND<	0.097	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	13197	ND<	0.123	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	10098	ND<	0.124	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	2513	ND<	0.059	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	2687	ND<	0.083	

GC/MS ANALYST: D. MILLS ANALYSIS DATE: 6/1/87

DATA ANALYST: T. GRACE ANALYSIS DATE: 6/9/87

DATA ENTRY: P. PERKINS ENTRY DATE: 6/16/87

Entry REVIEWED: P. Perkins DATE: 9/4/87

REVIEWED: Mike Kelly DATE: 9/8/87

REVIEWED: ____________ DATE: ________

DFT70200

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07
GC/MS DATA FILE: 8691F03X3
MRI SAMPLE NO: 7020 COND DUP

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2706	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	426812			NA
1716	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	103856	1.11		88.5
1808	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	77526	1.18		94.2
2362	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	54001	1.31		104.4
2977	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	216680	10.56		105.6
2231	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	255621	1.73		3.5
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	ND	0.00		0.0
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		0.0
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	ND	0.00		0.0
2734	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	7085	0.08		0.2
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	1890		0.010	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	3299	ND<	0.024	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	2774	ND<	0.021	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	2526	ND<	0.030	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.140	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	28947	ND<	0.215	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	32992	ND<	0.312	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	27744	ND<	0.308	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	2513	ND<	0.053	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	489	ND<	0.014	

GC/MS ANALYST: R. ROBSON   ANALYSIS DATE: 6/3/87
DATA ANALYST: T. GRACE   ANALYSIS DATE: 6/10/87
DATA ENTRY: P. PERKINS   ENTRY DATE: 6/12/87

Entry REVIEWED: ______ DATE: 9/4/87
REVIEWED: Mike Molloy DATE: 9/8/87
REVIEWED: ______ DATE: ______

DFT7025X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F09X2

MRI SAMPLE NO: 7025 CYCLONE

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	5.00 NG
13C-1,2,3,7,8-HxCDF	5.00 NG
13C-OCDF	5.00 NG
13C-1,2,3,4-TCDD	4.70 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2675	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	566824			NA
1689	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	105354	0.85		67.6
1779	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	68736	0.79		62.9
2329	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	58021	1.06		84.5
2946	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	246338	9.04		90.4
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	NA	0.00		0.0
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	NA	0.00		0.0
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	NA	0.00		0.0
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	NA	0.00		0.0
2702	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	12023	0.12		2.4
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	783059		3.968	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	327949		2.254	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	164728		1.097	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	62606		0.647	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	1612	ND<	0.037	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	14281		0.119	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	3299	ND<	0.029	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	42544		0.415	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	52009		0.973	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	34642		0.852	

GC/MS ANALYST: K. THORNBURG ANALYSIS DATE: 6-9-87 REVIEWED: DATE: 9/8/87

DATA ANALYST: T. GRACE ANALYSIS DATE: 6-15-87 REVIEWED: DATE: 9/8/87

DATA ENTRY: M.WHITACRE ENTRY DATE: 6-15-87 REVIEWED:________ DATE:________

DFT7026X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691E21X3

MRI SAMPLE NO: 7026 FILTER

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	5.00 NG
13C-1,2,3,7,8-HxCDF	5.00 NG
13C-OCDF	5.00 NG
13C-1,2,3,4-TCDD	4.70 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/13/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2714	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	825536			NA
1749	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.646	278722	1.29		102.1
1841	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.703	190085	1.35		108.2
2376	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.041	126605	1.47		117.9
2982	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.508	328520	7.83		78.3
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.575	ND	0.00		0.0
2629	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.369	92509	0.44		8.8
3224	13C-OCDF	454/456 (87/100)	454+456	2.224	1924	0.0263		0.5
1917	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.792	91046	0.33		7.1
2740	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.109	42945	0.32		6.4
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.548	8478172		14.924	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.600	3641904		9.989	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.378	1217614		5.811	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	4.319	395175		2.785	
NA	OCTA-CDF	442/444 (87/100)	442+444	2.054	35202		0.522	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.395	379354		1.042	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.767	405402		1.447	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.453	392095		2.680	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.255	258732		3.492	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.733	106042		1.862	

GC/MS ANALYST: R. ROBSON   ANALYSIS DATE: 5/21/87   Entry REVIEWED: P. Perkins DATE: 9/4/87

DATA ANALYST: T. GRACE   ANALYSIS DATE: 5/27/87   REVIEWED: Mike Malloy DATE: 9/8/87

DATA ENTRY: P. PERKINS   ENTRY DATE: 6/1/87   REVIEWED:________ DATE:________

DFT7027X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691E20X3

MRI SAMPLE NO: 7027 FRONT 1/2

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	5.00 NG
13C-1,2,3,7,8-HxCDF	5.00 NG
13C-OCDF	5.00 NG
13C-1,2,3,4-TCDD	4.70 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/13/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2715	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1052100			NA
1749	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.646	129014	0.46		37.1
1844	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.703	75912	0.42		33.9
2378	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.041	79435	0.73		58.0
2984	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.508	272600	5.10		51.0
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.575	ND	0.00		0.0
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.369	ND	0.00		0.0
NA	13C-OCDF	454/456 (87/100)	454+456	2.224	ND	0.00		0.0
1816	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.792	8099	0.07		1.6
2744	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.109	21337	0.19		3.8
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.548	1947780		7.407	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.600	797004		3.484	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.378	233829		1.345	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	4.319	56957		0.484	
NA	OCTA-CDF	442/444 (87/100)	442+444	2.054	1717	ND<	0.031	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.395	56867		0.391	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.767	73344		0.417	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.453	102198		0.842	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.255	57026		0.928	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.733	22218		0.470	

GC/MS ANALYST:	R. ROBSON	ANALYSIS DATE:	5/20/87	REVIEWED:		DATE:	9/4/87
DATA ANALYST:	M. MOLLOY	ANALYSIS DATE:	5/25/87	REVIEWED:		DATE:	3/20/87
DATA ENTRY:	P. PERKINS	ENTRY DATE:	5/27/87	REVIEWED:		DATE:	

DFT7028X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691E27X3

MRI SAMPLE NO: 7028 BACK 1/2

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	5.00 NG
13C-1,2,3,7,8-HxCDF	5.00 NG
13C-OCDF	5.00 NG
13C-1,2,3,4-TCDD	4.70 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2682	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	343316			NA
1695	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	59430	0.79		63.0
1787	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	41816	0.79		63.1
2339	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	31995	0.96		76.9
2952	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	137132	8.31		83.1
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	ND	0.00		0.0
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		0.0
1763	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	10255	0.18		3.9
2711	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	8756	0.16		3.1
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	799785		7.184	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	359106		4.476	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	115041		1.376	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	29899		0.555	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	2149	NO<	0.088	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	13135		0.180	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	19544		0.312	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	28970		0.508	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	31447		1.057	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	12706		0.561	

GC/MS ANALYST: R. ROBSON ANALYSIS DATE: 5/27/87 REVIEWED: C. CASSADY DATE: 6/2/87
DATA ANALYST: T. GRACE ANALYSIS DATE: 5/31/87 REVIEWED: L. Perkins DATE: 9/4/87
DATA ENTRY: P. PERKINS ENTRY DATE: 6/2/87 REVIEWED:______________ DATE:________

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DFT7029X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691E28X2

MRI SAMPLE NO: 7029 XAD

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	5.00 NG
13C-1,2,3,7,8-HxCDF	5.00 NG
13C-OCDF	5.00 NG
13C-1,2,3,4-TCDD	4.70 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2685	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	314812			NA
1700	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	54547	0.79		63.1
1792	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	50900	1.05		83.8
2341	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	26089	0.85		68.4
2953	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	91095	6.02		60.2
2211	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	535166	7.51		150.1
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	ND	0.00		0.0
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		0.0
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	ND	0.00		0.0
NA	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	ND	0.00		0.0
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	651964		6.380	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	138758		2.121	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	25129		0.452	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	4164		0.116	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.333	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	6061		0.068	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	6598	ND<	0.129	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	5549	ND<	0.146	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	1478		0.075	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	5115		0.340	

GC/MS ANALYST:	R. ROBSON	ANALYSIS DATE:	5/28/87	REVIEWED:	C. CASSADY	DATE:	6/2/87
DATA ANALYST:	T. GRACE	ANALYSIS DATE:	5/29/87	Entry REVIEWED:	P. Perkins	DATE:	9/8/87
DATA ENTRY:	P. PERKINS	ENTRY DATE:	6/2/87	REVIEWED:		DATE:	

(252)

DFT7030X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07
GC/MS DATA FILE: 8691F02X1
MRI SAMPLE NO: 7030 COND

RECOVERY INTERNAL STANDARD
13C-1,2,3,6,7,8-HxCDD 10.0 NG

LAB METHOD INTERNAL STANDARDS
13C-2,3,7,8-TCDF 1.25 NG
13C-2,3,7,8-TCDD 1.25 NG
13C-1,2,3,7,8-PeCDD 1.25 NG
13C-1,2,3,4,6,7,8-HPCDD 10.0 NG

FIELD METHOD INTERNAL STANDARDS
13C-1,2,3,7,8-PeCDF 5.00 NG
13C-1,2,3,7,8-HxCDF 5.00 NG
13C-OCDF 5.00 NG
13C-1,2,3,4-TCDD 4.70 NG
13C-1,2,3,7,8,9-HxCDD 5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2681	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	291512			NA
1693	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	70310	1.10		87.8
1784	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	50089	1.11		89.1
2337	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	30735	1.09		87.0
2952	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	117373	8.37		83.7
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
NA	13C-1,2,3,4,7,8-HxCDF	396/388 (100/82)	386+388	6.121	ND	0.00		0.0
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		0.0
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.589	ND	0.00		0.0
2710	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	6927	0.14		2.9
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	41240		0.313	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	18436		0.239	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	2774	ND<	0.039	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	2525	ND<	0.055	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	2686	ND<	0.129	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	23333	ND<	0.268	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	13196	ND<	0.219	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	6935	ND<	0.142	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	2512	ND<	0.099	
NA	OCTA-CDD	458/460 (97/100)	458+460	1.651	2686	ND<	0.139	

GC/MS ANALYST: R. ROBSON ANALYSIS DATE: 6/2/87
DATA ANALYST: J. PALAUSKY ANALYSIS DATE: 6/8/87
DATA ENTRY: P. PERKINS ENTRY DATE: 6/16/87

Entry REVIEWED: ____ DATE: 9/8/87
REVIEWED: Mike Molloy DATE: 9/8/87
REVIEWED: ____ DATE: ____

33V

DFT7035X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F09X3

MRI SAMPLE NO: 7035 CYCLONE

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.50 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.50 NG
13C-1,2,3,4,6,7,8-HPCDD	20.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	500.0 NG
13C-1,2,3,7,8-HxCDF	500.0 NG
13C-OCDF	500.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	500.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2679	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	626310			NA
1692	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	240644	1.75		69.9
1783	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	184720	1.91		76.4
2334	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	121974	2.01		80.4
2950	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	576788	19.15		95.8
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
2594	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	3241590	18.36		3.7
3190	13C-OCDF	454/456 (87/100)	454+456	1.972	1120192	19.69		3.9
1757	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	2975810	23.85		5.1
2707	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	1357144	11.45		2.3
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	3687018		16.358	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	1579555		10.330	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	548363		3.119	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	146313		1.292	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	15438		0.302	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	119611		0.744	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	176066		1.475	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	125159		1.043	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	147703		2.360	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	5374	NO<	0.113	

GC/MS ANALYST: K. THORNBURG ANALYSIS DATE: 6/9/87

DATA ANALYST: T. GRACE ANALYSIS DATE: 6/15/87

DATA ENTRY: P. PERKINS ENTRY DATE: 6/16/87

Entry REVIEWED: P. Perkins DATE: 9/8/87

REVIEWED: Mike Tralley DATE: 9/8/87

REVIEWED: ____________ DATE: ________

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DF70390R

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(RIS))*(AMT.(RIS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F04X6

MRI SAMPLE NO: 7036-39 DF(1-50)

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.2 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	NA
13C-2,3,7,8-TCDD	NA
13C-1,2,3,7,8-PeCDD	NA
13C-1,2,3,4,6,7,8-HPCDD	NA

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	10.0 NG
13C-1,2,3,7,8-HxCDF	10.0 NG
13C-OCDF	10.0 NG
13C-1,2,3,4-TCDD	9.40 NG
13C-1,2,3,7,8,9-HxCDD	10.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(RIS))*AMT.(RIS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2679	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	340900			NA
NA	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198		NA		NA
NA	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543		NA		NA
NA	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969		NA		NA
NA	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481		NA		NA
2204	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.319	672930	6.07		60.7
2595	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	2.950	58818	0.60		6.0
3190	13C-OCDF	454/456 (87/100)	454+456	0.953	13728	0.43		4.3
1758	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.589	170668	1.97		21.0
2708	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	1.978	46180	0.70		7.0
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342			NA	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134			NA	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097			NA	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925			NA	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774			NA	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176			NA	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446			NA	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160			NA	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170			NA	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651			NA	

GC/MS ANALYST:	D. MILLS	ANALYSIS DATE:	6/4/87	Entry REVIEWED: P. Perkins	DATE: 9/4/87
DATA ANALYST:	M. MOLLOY	ANALYSIS DATE:	6/17/87	REVIEWED: Mike Molloy	DATE: 9/8/87
DATA ENTRY:	P. PERKINS	ENTRY DATE:	7/24/87	REVIEWED:	DATE:

DFT7039X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691E30X5

MRI SAMPLE NO: 7036-39

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	500.0 NG
13C-1,2,3,7,8-HxCDF	500.0 NG
13C-OCDF	500.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	500.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2679	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	569080			NA
1694	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	285136	2.28		182.3
1786	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	55904	0.64		50.9
2334	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	45036	0.82		65.3
2948	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	209866	7.67		76.7
2204	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	45851100	372.49		74.5 *
2594	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	4570760	35.58		7.1 *
3185	13C-OCDF	454/456 (87/100)	454+456	1.972	1648224	39.82		8.0 *
1760	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	11216500	148.50		31.6 *
2706	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	3657720	42.41		8.5 *
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	5489344		10.277	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	2107444		18.664	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	674251		5.269	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	195347		2.371	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	27954		0.751	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	168693		1.734	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	251553		2.854	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	247967		2.841	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	247130		5.426	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	5374	ND<	0.155	

* = SURROGATE AREA OUT OF STANDARD CALIBRATION RANGE(SEE DILUTION ANALYZED 6/4/87)

GC/MS ANALYST:	R. ROBSON	ANALYSIS DATE:	5/30/87	Entry REVIEWED: P. Perkins	DATE: 7/4/87
DATA ANALYST:	C. CASSADY	ANALYSIS DATE:	6/3/87	REVIEWED: Mike Molloy	DATE: 7/8/87
DATA ENTRY:	P. PERKINS	ENTRY DATE:	6/3/87	REVIEWED:	DATE:

257

DFT7040X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F02X2

MRI SAMPLE NO: 7040 COMO

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	500.0 NG
13C-1,2,3,7,8-HxCDF	500.0 NG
13C-OCDF	500.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	500.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2680	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	429274			NA
1697	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	93034	0.99		78.9
1785	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	73180	1.10		88.4
2337	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	42834	1.03		82.3
2951	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	138933	6.73		67.3
2206	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	67441	0.58		0.1
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	ND	0.00		0.0
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		0.0
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	ND	0.00		0.0
2709	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	7345	0.13		0.03
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	34470		0.198	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	19692		0.183	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	1769		0.021	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	2525	ND<	0.046	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	2686	ND<	0.109	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	2916	ND<	0.023	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	3299	ND<	0.039	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	2774	ND<	0.048	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	2512	ND<	0.083	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	2686	ND<	0.117	

GC/MS ANALYST: R. ROBSON ANALYSIS DATE: 6/2/87

DATA ANALYST: J. PALAUSKY ANALYSIS DATE: 6/8/87

DATA ENTRY: P. PERKINS ENTRY DATE: 6/17/87

REVIEWED: DATE: 9/4/87

REVIEWED: Mike Molloy DATE: 9/8/87

REVIEWED:________ DATE:________

DFT7049X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691E29X5

MRI SAMPLE NO: 7045-49 BT

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	NA
13C-1,2,3,7,8-HxCDF	NA
13C-OCDF	NA
13C-1,2,3,4-TCDD	NA
13C-1,2,3,7,8,9-HxCDD	NA

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2681	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	427584			NA
1695	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	95113	1.01		80.9
1786	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	62620	0.95		75.9
2336	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	53754	1.30		103.7
2951	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	215985	10.51		105.1
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	NA	NA		NA
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	NA	NA		NA
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	NA	NA		NA
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	NA	NA		NA
NA	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	NA	NA		NA
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	9014		0.045	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	2966		0.022	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	1665	ND<	0.013	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	1501		0.018	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.140	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	5833	ND<	0.054	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	2639	ND<	0.025	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	1665	ND<	0.019	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	1392		0.030	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	9639		0.270	

GC/MS ANALYST: D. MILLS   ANALYSIS DATE: 5/29/87   Entries REVIEWED: P. Perkins DATE: 8/10/87
DATA ANALYST: T. GRACE   ANALYSIS DATE: 6/3/87   REVIEWED: Mike Donnelly DATE: 9/8/87
DATA ENTRY: P. PERKINS   ENTRY DATE: 6/5/87   REVIEWED: ____________ DATE: ________

DFT800SX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F09X4

MRI SAMPLE NO: 8005 CYCLONE

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2676	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	660472			NA
1686	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	137276	0.95		75.6
1776	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	90640	0.89		71.1
2329	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	80847	1.26		101.0
2946	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	338632	10.66		106.6
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
2590	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	153389	0.74		1.5
3187	13C-OCDF	454/456 (87/100)	454+456	1.972	41739	0.62		1.2
1752	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	156397	1.28		2.7
2703	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	70984	0.51		1.0
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	4976997		19.354	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	2304533		11.369	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	817937		3.962	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	257467		1.937	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	22139		0.369	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	268934		1.705	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	273481		1.729	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	311361		2.211	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	233635		3.179	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	130899		2.341	

GC/MS ANALYST:	D. MILLS	ANALYSIS DATE:	6-9-87	Entry REVIEWED:	DATE: 9/8/87
DATA ANALYST:	T. GRACE	ANALYSIS DATE:	6-15-87	REVIEWED: Mike Kolloy	DATE: 9/8/87
DATA ENTRY:	M. WHITACRE	ENTRY DATE:	6-15-87	REVIEWED: ______	DATE: ______

DFT8006X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691E21X6

MRI SAMPLE NO: 8006 FILTER

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/13/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2714	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	874192			NA
1723	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.646	293000	1.27		101.3
1817	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.703	192496	1.29		103.5
2369	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.041	121534	1.34		106.8
2985	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.508	309228	6.96		69.6
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.575	ND	0.00		0.0
2628	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.369	1915088	9.72		19.4
3227	13C-OCDF	454/456 (87/100)	454+456	2.224	218759	3.19		6.4
1791	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.792	2201726	7.98		17.0
2741	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.109	592258	4.66		9.3
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.548	29413570		49.253	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.600	11634374		33.244	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.378	3784847		19.190	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	4.319	844191		6.322	
NA	OCTA-CDF	442/444 (87/100)	442+444	2.054	50520		0.795	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.395	1363422		3.697	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.767	1214016		4.513	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.453	782134		5.680	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.255	396612		5.688	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.733	116648		2.177	

GC/MS ANALYST: D. MILLS ANALYSIS DATE: 5/21/87

DATA ANALYST: T. GRACE ANALYSIS DATE: 5/28/87

DATA ENTRY: P. PERKINS ENTRY DATE: 5/29/87

Entry REVIEWED: DATE: 9/8/87

REVIEWED: Mike Molloy DATE: 9/8/87

REVIEWED: ____________ DATE: ________

DFT8007X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691E20X4

MRI SAMPLE NO: 8007 FRONT 1/2

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/13/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2701	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	919676			NA
1720	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.646	96257	0.40		31.6
1814	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.703	36776	0.23		18.8
2359	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.041	53330	0.56		44.6
2972	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.508	155051	3.32		33.2
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.575	ND	0.00		0.0
2617	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.369	161012	1.63		3.3
3215	13C-OCDF	454/456 (87/100)	454+456	2.224	17425	0.51		1.0
1788	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.792	220770	4.19		8.9
2729	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.109	49210	0.77		1.5
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.548	4339631		22.119	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.600	1789510		11.653	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.378	594336		6.010	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	4.319	122916		1.836	
NA	OCTA-CDF	442/444 (87/100)	442+444	2.054	4996		0.157	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.395	198788		2.822	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.767	242558		2.055	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.453	198750		2.878	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.255	107942		3.087	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.733	34797		1.295	

GC/MS ANALYST: D. MILLS	ANALYSIS DATE: 5/20/87	Entry REVIEWED:	DATE: 9/4/87
DATA ANALYST: T. GRACE	ANALYSIS DATE: 5/26/87	REVIEWED: Mike Malloy	DATE: 9/8/87
DATA ENTRY: P. PERKINS	ENTRY DATE: 5/27/87	REVIEWED:	DATE:

DFT8008X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691E27X4

MRI SAMPLE NO: 8008 BACK 1/2

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2681	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	453308			NA
1698	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	103030	1.03		82.7
1789	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	73599	1.05		84.2
2339	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	51984	1.18		94.6
2951	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	188632	8.65		86.5
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
2598	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	11133	0.10		0.2
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		0.0
1764	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	9674	0.10		0.2
2711	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	12092	0.16		0.3
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	74253		0.385	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	59815		0.459	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	16119		0.140	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	5051	ND<	0.068	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.161	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	5789	ND<	0.045	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	6599	ND<	0.065	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	2774	ND<	0.035	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	5025	ND<	0.123	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	5374	ND<	0.173	

GC/MS ANALYST:	R. ROBSON	ANALYSIS DATE:	5/27/87	REVIEWED:	C. CASSADY	DATE:	5/2/87
DATA ANALYST:	T. GRACE	ANALYSIS DATE:	5/31/87	REVIEWED:		DATE:	9/4/87
DATA ENTRY:	P. PERKINS	ENTRY DATE:	6/1/87	REVIEWED:		DATE:	

DFT8009X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691E28X3

MRI SAMPLE NO: 8009 XAD

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2684	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	456190			NA
1698	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	106764	1.06		85.2
1790	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	78952	1.12		89.7
2339	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	50628	1.14		91.6
2952	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	157210	7.17		71.7
2208	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	6322060	45.69		91.4
2599	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	97527	1.01		2.0
3190	13C-OCDF	454/456 (87/100)	454+456	1.972	8535	0.29		0.6
1763	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	155894	1.46		3.1
2712	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	46748	0.72		1.4
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	4228983		21.145	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	1198178		9.439	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	246888		2.576	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	28565		0.463	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	1612	ND<	0.058	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	104962		0.764	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	16078		0.162	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	11009		0.168	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	8754		0.257	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	4392		0.169	

GC/MS ANALYST: R. ROBSON ANALYSIS DATE: 5/28/87 Entry REVIEWED: P. Perkins DATE: 9/4/87

DATA ANALYST: T. GRACE ANALYSIS DATE: 5/30/87 REVIEWED: Mike Molloy DATE: 9/9/87

DATA ENTRY: P. PERKINS ENTRY DATE: 6/1/87 REVIEWED:________ DATE:________

DFT8010X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F02X3

MRI SAMPLE NO: 8010 COND

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2683	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	459048			NA
1699	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	79214	0.78		62.8
1798	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	70989	1.00		80.2
2338	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	42736	0.96		76.8
2954	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	131149	5.94		59.4
2210	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	62716	0.54		1.1
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	ND	0.00		0.0
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		0.0
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	ND	0.00		0.0
2713	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	6201	0.12		0.2
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	147395		0.993	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	18796		0.175	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	12841		0.161	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	1515	ND<	0.029	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	2686	ND<	0.115	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	5833	ND<	0.047	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	6598	ND<	0.079	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	2774	ND<	0.051	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	1507	ND<	0.053	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	2686	ND<	0.124	

GC/MS ANALYST: R. ROBSON ANALYSIS DATE: 6/2/87 Entry REVIEWED: L. Perkins DATE: 9/14/87

DATA ANALYST: J. PALAUSKY ANALYSIS DATE: 6/8/87 REVIEWED: Mike Malloy DATE: 9/8/87

DATA ENTRY: P. PERKINS ENTRY DATE: 6/17/87 REVIEWED:________ DATE:______

DFT8015X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F09X5

MRI SAMPLE NO: 8015 CYCLONE

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2672	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	551708			NA
1668	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	109514	0.90		72.2
1757	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	90480	1.06		85.0
2321	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	57431	1.07		85.9
2945	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	270680	10.20		102.0
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	ND	0.00		0.0
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		0.0
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	ND	0.00		0.0
NA	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	ND	0.00		0.0
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	476847		2.324	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	108254		0.752	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	50505		0.306	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	27014		0.254	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	1612	ND<	0.034	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	5789	ND<	0.037	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	1980	ND<	0.018	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	6945		0.062	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	13684		0.233	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	8775		0.196	

GC/MS ANALYST: D. MILLS ANALYSIS DATE: 6/9/87 Entry REVIEWED: P. Perkins DATE: 9/8/87

DATA ANALYST: T. GRACE ANALYSIS DATE: 6/15/87 REVIEWED: Mike Kelley DATE: 9/8/87

DATA ENTRY: P. PERKINS ENTRY DATE: 6/16/87 REVIEWED:________________ DATE:________

DFT8016X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07
GC/MS DATA FILE: 8691E21X7
MRI SAMPLE NO: 8016 FILTER

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2721	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	538584			NA
1757	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	161823	1.37		109.3
1852	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	105766	1.27		101.8
2384	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	83570	1.60		128.1
2988	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	221596	8.56		85.6
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
2637	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	38658	0.29		0.6
3231	13C-OCDF	454/456 (87/100)	454+456	1.972	1809	0.04		0.1
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	19016	0.13		0.3
2749	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	26179	0.29		0.6
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	39445		0.130	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	21124		0.101	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	7503		0.056	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	5174		0.059	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.137	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	5789	ND<	0.031	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	3299	ND<	0.020	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	5549	ND<	0.060	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	4176	ND<	0.097	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	2688	ND<	0.073	

GC/MS ANALYST: DAVE MILLS
ANALYSIS DATE: 05/21/87
REVIEWED: DATE: 9/8/87

DATA ANALYST: TIM GRACE
ANALYSIS DATE: 05/29/87
REVIEWED: Mike Molloy DATE: 9/8/87

DATA ENTRY: PJ BOONE
ENTRY DATE: 06/02/87
REVIEWED:________ DATE:________

DFT8017X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07
GC/MS DATA FILE: 8691E20X7
MRI SAMPLE NO: 8017 FRONT 1/2

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/13/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2701	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	941728			NA
1714	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.646	108189	0.43		34.7
1808	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.703	66241	0.41		33.0
2358	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.041	44572	0.45		36.4
2973	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.508	131203	2.74		27.4
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.575	ND	0.00		0.0
2616	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.369	238537	2.85		5.7
3216	13C-OCDF	454/456 (87/100)	454+456	2.224	32186	1.10		2.2
1781	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.792	329790	3.47		7.4
2729	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.109	68357	1.27		2.5
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.548	6025884		27.327	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.600	2245471		17.495	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.378	787949		9.416	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	4.319	175259		3.093	
NA	OCTA-CDF	442/444 (87/100)	442+444	2.054	7079		0.263	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.395	244559		1.927	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.767	258147		2.616	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.453	318648		5.454	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.255	143789		4.860	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.733	46640		2.051	

GC/MS ANALYST: D. MILLS ANALYSIS DATE: 5/20/87 Entry REVIEWED: ________ DATE: 9/4/87
DATA ANALYST: T. GRACE ANALYSIS DATE: 5/26/87 REVIEWED: Mike Malloy DATE: 9/8/87
DATA ENTRY: P. PERKINS ENTRY DATE: 5/28/87 REVIEWED: ________ DATE: ________

DFT8018X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07
GC/MS DATA FILE: 8691E27XS
MRI SAMPLE NO: 8018 BACK 1/2

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2685	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	440342			NA
1701	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	112901	1.17		93.3
1792	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	101442	1.49		119.4
2341	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	57375	1.34		107.5
2955	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	201024	9.49		94.9
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
2601	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	233242	1.90		3.8
3196	13C-OCDF	454/456 (87/100)	454+456	1.972	47685	1.20		2.4
1767	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	277075	2.02		4.3
2713	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	82179	0.99		2.0
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	3394261		16.049	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	1413712		9.827	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	486968		3.973	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	112896		1.431	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	7020		0.197	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	101775		0.576	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	109923		0.979	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	75799		0.907	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	62026		1.422	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	29797		0.898	

GC/MS ANALYST: D. MILLS ANALYSIS DATE: 5/27/87 REVIEWED: C. CASSADY DATE: 6/3/87
DATA ANALYST: T. GRACE ANALYSIS DATE: 5/28/87 REVIEWED: DATE: 9/4/89
DATA ENTRY: P. PERKINS ENTRY DATE: 6/1/87 REVIEWED:__________ DATE:______

DFT8019X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07
GC/MS DATA FILE: 8691E28X4
MRI SAMPLE NO: 8019 XAD

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2683	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	513822			NA
1700	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	142663	1.26		101.0
1790	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	89532	1.13		90.3
2340	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	58776	1.18		94.4
2951	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	199909	8.09		80.9
2209	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	6130980	38.16		76.3
2599	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	178923	1.46		2.9
3188	13C-OCDF	454/456 (87/100)	454+456	1.972	18002	0.46		0.9
1765	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	273958	2.26		4.8
2712	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	84623	1.03		2.1
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	4967112		18.586	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	1412497		9.585	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	291596		2.392	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	34650		0.442	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	1612	ND<	0.045	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	146372		0.939	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	12731		0.111	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	13520		0.163	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	10928		0.252	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	5374	ND<	0.163	

GC/MS ANALYST: R. ROBSON
ANALYSIS DATE: 5/28/87
DATA ANALYST: T. GRACE
ANALYSIS DATE: 5/29/87
DATA ENTRY: P. PERKINS
ENTRY DATE: 6/1/87

Entry REVIEWED: DATE: 9/4/87
REVIEWED: Mike Molloy DATE: 9/8/87
REVIEWED:____________ DATE:______

DFT8020X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F02X4

MRI SAMPLE NO: 8020 COND

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2680	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	362460			NA
1694	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	84858	1.06		85.2
1784	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	59549	1.06		85.2
2335	13C-1,2,3,7,8-PeCDD	366/358 (61/100)	368	0.969	42497	1.21		96.8
2951	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	135852	7.90		78.0
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	ND	0.00		0.0
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		0.0
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	ND	0.00		0.0
2708	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	7787	0.14		0.3
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	133798		0.842	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	41058		0.385	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	5520		0.067	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	2526	ND<	0.047	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.223	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	28947	ND<	0.279	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	13197	ND<	0.159	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	11098	ND<	0.196	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	5025	ND<	0.170	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	5374	ND<	0.240	

GC/MS ANALYST:	R. ROBSON	ANALYSIS DATE:	6/2/87	Entry REVIEWED: P. Perkins	DATE: 9/4/87
DATA ANALYST:	T. GRACE	ANALYSIS DATE:	6/10/87	REVIEWED: Mike Molloy	DATE: 9/9/87
DATA ENTRY:	P. PERKINS	ENTRY DATE:	6/15/87	REVIEWED:	DATE:

DFT802SX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-UCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F10X3

MRI SAMPLE NO: 8025 CYCLONE

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.50 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.50 NG
13C-1,2,3,4,6,7,8-HPCDD	20.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	500 NG
13C-1,2,3,7,8-HxCDF	500 NG
13C-OCDF	500 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	500 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2663	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	602162			NA
1684	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	270704	2.04		81.8
1774	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	208820	2.25		89.9
2320	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	139711	2.39		95.7
2934	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	626416	21.64		108.2
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
2577	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	4201730	21.92		4.4
3173	13C-OCDF	454/456 (87/100)	454+456	1.972	1344860	21.77		4.4
1748	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	4826990	34.22		7.3
2691	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	1719040	13.35		2.7
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	11327278		44.673	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	4702178		26.847	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	1587407		8.313	
NA	TOTAL-HEPTA-CDF	408/410 (100/99)	408+410	3.925	424312		3.451	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	41268		0.743	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	765466		4.212	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	742910		5.435	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	1298154		9.964	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	416455		6.127	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	NA		0.000	

GC/MS ANALYST: M. WICKHAM   ANALYSIS DATE: 6-10-87   Entry REVIEWED: L. Parker DATE: 9/4/87

DATA ANALYST: T. GRACE   ANALYSIS DATE: 6-16-87   REVIEWED: Mike Molloy DATE: 9/8/87

DATA ENTRY: M. WHITACRE   ENTRY DATE: 6-16-87   REVIEWED: ________ DATE: ______

DF90290R

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(RIS))*(AMT.(RIS)/RF)

PROJECT NO: 8691L07
GC/MS DATA FILE: 8691F04X7
MRI SAMPLE NO: 8026-29 DF(1-50)

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.2 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	NA
13C-2,3,7,8-TCDD	NA
13C-1,2,3,7,8-PeCDD	NA
13C-1,2,3,4,6,7,8-HPCDD	NA

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	10.0 NG
13C-1,2,3,7,8-HxCDF	10.0 NG
13C-OCDF	10.0 NG
13C-1,2,3,4-TCDD	9.40 NG
13C-1,2,3,7,8,9-HxCDD	10.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(RIS))*AMT.(RIS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2669	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	329056			NA
NA	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198		NA		NA
NA	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543		NA		NA
NA	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969		NA		NA
NA	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481		NA		NA
2185	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.319	972088	9.08		90.8
2583	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	2.950	232940	2.45		24.5
3180	13C-OCDF	454/456 (87/100)	454+456	0.953	45979	1.50		15.0
1733	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.589	260192	3.12		33.1
2697	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	1.978	83788	1.31		13.1
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342			NA	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134			NA	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097			NA	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925			NA	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774			NA	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176			NA	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446			NA	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160			NA	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170			NA	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651			NA	

GC/MS ANALYST:	D. MILLS	ANALYSIS DATE:	6/4/87	Entry REVIEWED: P. Perkins	DATE: 9/4/87
DATA ANALYST:	M. MOLLOY	ANALYSIS DATE:	6/17/87	REVIEWED:	DATE: 3/20/89
DATA ENTRY:	P. PERKINS	ENTRY DATE:	7/24/87	REVIEWED:	DATE:

DFT8029X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07
GC/MS DATA FILE: 9691E31X1
MRI SAMPLE NO: 8026-29

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	500.0 NG
13C-1,2,3,7,8-HxCDF	500.0 NG
13C-OCDF	500.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	500.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2683	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	484214			NA
1701	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	236170	2.22		177.5
1791	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	50995	0.68		54.6
2340	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	46679	0.99		79.6
2952	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	136346	5.86		58.6
2210	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	53721900	421.07		84.2 *
2597	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	12690130	152.05		30.4 *
3192	13C-OCDF	454/456 (87/100)	454+456	1.972	2641220	98.22		19.6 *
1766	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	15347830	222.75		47.4 *
2710	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	4864540	86.91		17.4 *
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	16612415		37.549	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	5905327		50.457	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	1897038		22.820	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	432806		8.087	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	36483		1.508	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	569648		6.418	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	556578		6.093	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	385435		6.796	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	282750		9.556	
3184	OCTA-CDD	458/460 (87/100)	458+460	1.651	106684		4.739	

* = SURROGATE AREA OUT OF STANDARD CALIBRATION RANGE(SEE DILUTION ANALYZED 6/4/87)

GC/MS ANALYST: R. ROBSON ANALYSIS DATE: 5/31/87
DATA ANALYST: T. GRACE ANALYSIS DATE: 6/3/87
DATA ENTRY: P. PERKINS ENTRY DATE: 6/5/87

Entry REVIEWED: P. Perkins DATE: 9/8/87
REVIEWED: Mike Molloy DATE: 9/8/87
REVIEWED:______________ DATE:________

DFT8030X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07
GC/MS DATA FILE: 8691F02X5
MRI SAMPLE NO: 8030 CONO

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	500.0 NG
13C-1,2,3,7,8-HxCDF	500.0 NG
13C-OCDF	500.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	400.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2683	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	405156			NA
1695	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	87852	0.99		78.9
1785	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	63022	1.01		80.6
2338	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	44566	1.13		90.8
2954	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	131880	6.77		67.7
2206	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	66550	0.55		0.1
2598	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	23390	0.29		0.1
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		0.0
1760	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	36369	0.43		0.1
2710	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	18283	0.34		0.1
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	86389		0.525	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	51330		0.459	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	9300		0.116	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	2526	ND<	0.049	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.230	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	28947	ND<	0.264	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	6598	ND<	0.076	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	5549	ND<	0.101	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	2513	ND<	0.088	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	2687	ND<	0.123	

GC/MS ANALYST: R. ROBSON ANALYSIS DATE: 6/2/87
DATA ANALYST: T. GRACE ANALYSIS DATE: 6/9/87
DATA ENTRY: P. PERKINS ENTRY DATE: 6/15/87

Entry REVIEWED: P. Perkins DATE: 9/4/87
REVIEWED: Mike Molloy DATE: 9/8/87
REVIEWED: ______________ DATE: ________

DFT8035X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07
GC/MS DATA FILE: 8691F10X4
MRI SAMPLE NO: 8035 CYCLONE

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	5.00 NG
13C-1,2,3,7,8-HxCDF	5.00 NG
13C-OCDF	5.00 NG
13C-1,2,3,4-TCDD	4.70 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2664	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	510652			NA
1687	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	111572	0.99		79.5
1777	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	76528	0.97		77.7
2322	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	57295	1.16		92.6
2934	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	237420	9.67		96.7
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	NA	0.00		0.0
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	NA	0.00		0.0
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	NA	0.00		0.0
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	NA	0.00		0.0
2693	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	19099	0.20		3.9
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	7362181		35.224	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	2789165		19.416	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	895170		6.184	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	214459		2.301	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	15334		0.364	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	386691		2.903	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	406933		3.629	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	373996		3.787	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	216252		4.197	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	81589		2.081	

GC/MS ANALYST: M. WICKHAM ANALYSIS DATE: 6-10-87
DATA ANALYST: T. GRACE ANALYSIS DATE: 6-15-87
DATA ENTRY: M.WHITACRE ENTRY DATE: 6-17-87

Entry REVIEWED: DATE: 9/8/87
REVIEWED: Mike Kelly DATE: 7/8/87
REVIEWED: ____________ DATE: ______

DFT8039X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691E29X1

MRI SAMPLE NO: 8036-39

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	5.00 NG
13C-1,2,3,7,8-HxCDF	5.00 NG
13C-OCDF	5.00 NG
13C-1,2,3,4-TCDD	4.70 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2685	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	602606			NA
1699	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	153522	1.16		92.7
1789	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	102926	1.11		98.5
2340	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	75154	1.29		102.9
2955	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	303543	10.48		104.8
2209	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	1264772	6.16		123.1
2600	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	257518	1.39		27.7
3195	13C-OCDF	454/456 (87/100)	454+456	1.972	53322	0.89		17.8
1764	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	207172	1.49		31.7
2712	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	111818	0.90		17.9
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	20119576		69.958	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	8155232		43.279	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	2848443		15.391	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	755675		6.342	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	68401		1.270	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	1028725		5.742	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	760949		5.174	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	802602		6.357	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	546890		8.302	
3187	OCTA-CDD	458/460 (87/100)	458+460	1.651	265787		5.303	

GC/MS ANALYST: R. ROBSON ANALYSIS DATE: 5/29/87

DATA ANALYST: T. GRACE ANALYSIS DATE: 6/2/87

DATA ENTRY: P. PERKINS ENTRY DATE: 6/3/87

Entry REVIEWED: P. Perkins DATE: 9/8/87

REVIEWED: Mike Molloy DATE: 9/8/87

REVIEWED:__________ DATE:_____

DFT8040X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F02X6

MRI SAMPLE NO: 8040 COND

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	5.00 NG
13C-1,2,3,7,8-HxCDF	5.00 NG
13C-OCDF	5.00 NG
13C-1,2,3,4-TCDD	4.70 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2680	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	410288			NA
1695	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	86895	0.96		77.1
1786	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	55390	0.87		70.0
2336	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	40670	1.02		81.8
2950	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	124607	6.32		63.2
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	ND	0.00		0.0
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		0.0
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	ND	0.00		0.0
2709	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	6633	0.13		2.6
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	44446		0.273	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	22348		0.219	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	2774	ND<	0.037	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	2526	ND<	0.052	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.243	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	5789	ND<	0.060	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	6598	ND<	0.083	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	5549	ND<	0.107	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	2513	ND<	0.093	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	2687	ND<	0.131	

GC/MS ANALYST:	D. MILLS	ANALYSIS DATE:	6/2/87	Entry	REVIEWED:	DATE: 9/4/87
DATA ANALYST:	T. GRACE	ANALYSIS DATE:	6/9/87		REVIEWED: Mike Molley	DATE: 9/3/87
DATA ENTRY:	P. PERKINS	ENTRY DATE:	6/15/87		REVIEWED:	DATE:

DFT8049X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691E30X3

MRI SAMPLE NO: 8045-49 BT

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	NA
13C-1,2,3,7,8-HxCDF	NA
13C-OCDF	NA
13C-1,2,3,4-TCDD	NA
13C-1,2,3,7,8,9-HxCDD	NA

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2679	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	429788		-	NA
1694	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	104800	1.11		88.7
1784	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	84423	1.27		101.8
2333	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	54622	1.31		104.9
2947	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	218001	10.55		105.5
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	NA	NA		NA
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	NA	NA		NA
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	NA	NA		NA
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	NA	NA		NA
NA	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	NA	NA		NA
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	49276		0.251	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	19140.		0.140	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	5549	ND<	0.042	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	2091		0.024	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5051	ND<	0.131	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	5833	ND<	0.040	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	6598	ND<	0.062	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	5025	ND<	0.055	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	7214		0.152	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	9038		0.251	

GC/MS ANALYST: R. ROBSON ANALYSIS DATE: 5/30/87 Entries REVIEWED: P. [illegible] DATE: 8/10/87

DATA ANALYST: C. CASSADY ANALYSIS DATE: 6/3/87 REVIEWED: Mike Molly DATE: 9/9/87

DATA ENTRY: P. PERKINS ENTRY DATE: 6/3/87 REVIEWED: ________ DATE: ______

DFT9005X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETR_OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07
GC/MS DATA FILE: 8691F09X6
MRI SAMPLE NO: 9005 CYCLONE

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2672	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	474832			NA
NA	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	ND	0.00		0.0
NA	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	ND	0.00		0.0
NA	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	ND	0.00		0.0
NA	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	ND	0.00		0.0
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	ND	0.00		0.0
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		0.0
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	ND	0.00		0.0
2702	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	10363	0.05		0.1
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	575622		5.177 *	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	98274		0.660 *	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	106921		0.369 *	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	39810		0.214 *	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	660		0.008 *	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	29581		0.206 *	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	19458		0.168 *	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	42041		0.213 *	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	35812		0.348 *	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	16635		0.212 *	

* = MDL DETERMINED USING 13C-1,2,3,6,7,8-HxCDD PEAK AREA

GC/MS ANALYST:	D. MILLS	ANALYSIS DATE:	6/9/87	REVIEWED: P. Perkins	DATE: 9/14/87
DATA ANALYST:	T. GRACE	ANALYSIS DATE:	6/15/87	REVIEWED: Mike [illegible]	DATE: 9/8/87
DATA ENTRY:	P. PERKINS	ENTRY DATE:	6/16/87	REVIEWED:	DATE:

DFT9006X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691E21X8

MRI SAMPLE NO: 9006 FILTER

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/13/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2723	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	802628			NA
1754	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.646	232368	1.09		87.5
1847	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.703	142600	1.04		83.5
2384	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.041	99456	1.19		95.2
2991	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.508	231522	5.68		56.8
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.575	ND	0.00		0.0
2638	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.369	1753208	11.89		23.8
3232	13C-OCDF	454/456 (87/100)	454+456	2.224	221318	4.30		8.6
1821	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.792	1878486	9.19		19.5
2750	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.109	552706	5.81		11.6
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.548	35717179		75.414	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.600	15306800		53.446	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.378	5308302		35.947	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	4.319	1233648		12.338	
NA	OCTA-CDF	442/444 (87/100)	442+444	2.054	89153		1.874	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.395	3076959		11.264	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.767	2564161		11.647	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.453	1807659		17.533	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.255	738462		14.144	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.733	226498		5.645	

GC/MS ANALYST: D. MILLS ANALYSIS DATE: 5/21/87

DATA ANALYST: T. GRACE ANALYSIS DATE: 5/28/87

DATA ENTRY: P. PERKINS ENTRY DATE: 5/29/87

REVIEWED: C. Perkins DATE: 9/8/87

REVIEWED: Mike Malloy DATE: 9/8/87

REVIEWED:________ DATE:______

DFT9007X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691E20X6

MRI SAMPLE NO: 9007 FRONT 1/2

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/13/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2716	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	956120			NA
1750	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.646	107146	0.42		33.9
1844	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.703	53669	0.33		26.4
2378	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.041	54965	0.55		44.2
2985	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.508	164580	3.39		33.9
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.575	ND	0.00		0.0
2633	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.369	250854	2.39		4.79
3227	13C-OCDF	454/456 (87/100)	454+456	2.224	31705	0.87		1.73
1817	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.792	341002	4.43		9.43
2745	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.109	75197	1.11		2.22
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.548	7386162		33.821	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.600	3160227		19.966	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.378	1083057		10.318	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	4.319	271163		3.815	
NA	OCTA-CDF	442/444 (87/100)	442+444	2.054	11840		0.350	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.395	692907		6.740	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.767	636967		5.235	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.453	551847		7.530	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.255	252314		6.798	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.733	73690		2.583	

GC/MS ANALYST:	R. ROBSON	ANALYSIS DATE:	5/20/87	Entry REVIEWED:	DATE: 9/8/87
DATA ANALYST:	M. MOLLOY	ANALYSIS DATE:	5/25/87	REVIEWED:	DATE: 3/20/89
DATA ENTRY:	P. PERKINS	ENTRY DATE:	5/26/87	REVIEWED:	DATE:

DFT9008X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691E27X6

MRI SAMPLE NO: 9008 BACK HALF

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2689	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	339140			NA
1704	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	78650	1.05		84.4
1795	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	57131	1.09		87.3
2345	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	38028	1.16		92.5
2958	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	125056	7.67		76.7
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
2605	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	6182	0.08		0.2
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		0.0
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	ND	0.00		0.0
2717	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	6020	0.12		0.2
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	50614		0.344	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	57798		0.606	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	9278		0.109	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	2020	ND<	0.041	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.242	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	5789	ND<	0.058	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	1980	ND<	0.027	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	2220	ND<	0.043	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	1508	ND<	0.056	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	5374	ND<	0.260	

GC/MS ANALYST:	DAVE MILLS	ANALYSIS DATE:	05/27/86	REVIEWED:	C. CASSADY	DATE:	6/3/87
DATA ANALYST:	TIM GRACE	ANALYSIS DATE:	06/01/87	REVIEWED:		DATE:	9/8/87
DATA ENTRY:	PJ BOONE	ENTRY DATE:	06/02/87	REVIEWED:		DATE:	

DFT9009X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691607X9

MRI SAMPLE NO: 9009 XAD

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (7/7/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
1697	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	801448			NA
1044	13C-2,3,7,8-TCDF	316/318 (76/100)	316	4.320	370095	1.07		85.5
1076	13C-2,3,7,8-TCDD	332/334 (76/100)	332	3.896	208757	0.67		53.5
1350	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.530	113594	0.93		74.1
2018	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.490	391856	9.97		99.7
1267	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.086	18005050	64.20		128.4
1603	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.485	177058	0.70		1.4
2285	13C-OCDF	454/456 (87/100)	454+456	2.592	27273	0.27		0.5
1067	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.314	442254	2.02		4.3
1731	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	5.135	81836	0.41		0.8
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.488	19612019		26.623	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.014	4909087		17.924	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.373	1021217		4.089	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	4.714	194113		1.051	
NA	OCTA-CDF	442/444 (87/100)	442+444	2.372	19868		0.214	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.359	1449494		3.679	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.756	465208		1.957	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	5.565	178331		0.818	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.373	87299		0.939	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.932	32621		0.431	

GC/MS ANALYST:	D. MILLS	ANALYSIS DATE:	7/7/87	Entry REVIEWED: P. Perkins	DATE: 9/18/87
DATA ANALYST:	M. MOLLOY	ANALYSIS DATE:	7/8/87	REVIEWED: Dw	DATE:
DATA ENTRY:	P. PERKINS	ENTRY DATE:	7/9/87	REVIEWED:	DATE:

DFT9010X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F02X7

MRI SAMPLE NO: 9010 COND

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2575	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	491192			NA
1675	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	113176	1.05		83.8
1766	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	78159	1.03		82.5
2325	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	55710	1.17		93.6
2947	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	236682	10.02		100.2
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	ND	0.00		0.0
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		0.0
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	ND	0.00		0.0
2702	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	11432	0.12		0.2
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	238694		1.126	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	82142		0.588	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	20354		0.141	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	5188		0.056	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.128	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	5789	ND<	0.043	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	6598	ND<	0.061	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	5549	ND<	0.056	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	2513	ND<	0.049	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	2687	ND<	0.069	

GC/MS ANALYST: D. MILLS   ANALYSIS DATE: 6/2/87   Entry REVIEWED: L. Perkins   DATE: 9/8/87

DATA ANALYST: T. GRACE   ANALYSIS DATE: 6/2/87   REVIEWED: Mike Molloy   DATE: 9/8/87

DATA ENTRY: P. PERKINS   ENTRY DATE: 6/15/87   REVIEWED: ____________   DATE: ______

DFT9015X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F10XS

MRI SAMPLE NO: 9015 CYCLONE

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.50 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.50 NG
13C-1,2,3,4,6,7,8-HPCDD	20.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	500 NG
13C-1,2,3,7,8-HxCDF	500 NG
13C-OCDF	500 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	500 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2664	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	461208			NA
1686	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	91216	0.90		36.0
1774	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	63072	0.89		35.4
2321	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	58896	1.32		52.7
2935	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	195196	8.80		44.0
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
2579	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	1345460	22.52		4.5
3175	13C-OCDF	454/456 (87/100)	454+456	1.972	381794	19.33		4.0
1748	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	1665104	39.08		8.3
2691	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	513282	12.80		2.6
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	3373546		39.485	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	1414055		19.152	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	500480		8.411	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	124434		3.248	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	11404		0.659	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	391788		7.138	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	301219		5.227	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	156932		3.866	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	142445		6.725	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	5374		0.333	

GC/MS ANALYST: M. WICKHAM ANALYSIS DATE: 6-10-87

DATA ANALYST: T. GRACE ANALYSIS DATE: 6-15-87

DATA ENTRY: M. WHITACRE ENTRY DATE: 6-15-87

Entry REVIEWED: ______ DATE: 9/4/87

REVIEWED: Mike Kelley DATE: 9/8/87

REVIEWED: ______ DATE: ______

DF90190R

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(RIS))*(AMT.(RIS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F04X8

MRI SAMPLE NO: 9016-19 DF(1-50)

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.2 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	NA
13C-2,3,7,8-TCDD	NA
13C-1,2,3,7,8-PeCDD	NA
13C-1,2,3,4,6,7,8-HPCDD	NA

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	10.0 NG
13C-1,2,3,7,8-HxCDF	10.0 NG
13C-OCDF	10.0 NG
13C-1,2,3,4-TCDD	9.40 NG
13C-1,2,3,7,8,9-HxCDD	10.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(RIS))*AMT.(RIS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2677	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	351500			NA
NA	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198		NA		NA
NA	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543		NA		NA
NA	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969		NA		NA
NA	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481		NA		NA
2201	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.319	1155036	10.10		101.0
2593	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	2.350	215416	2.12		21.2
3187	13C-OCDF	454/456 (87/100)	454+456	0.953	43725	1.33		13.3
1756	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.589	241298	2.70		28.8
2705	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	1.978	38354	1.30		13.0
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342			NA	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134			NA	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097			NA	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925			NA	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774			NA	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176			NA	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446			NA	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160			NA	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170			NA	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651			NA	

GC/MS ANALYST: D. MILLS ANALYSIS DATE: 6/4/87 Entry REVIEWED: P. Perkins DATE: 9/8/87

DATA ANALYST: M. MOLLOY ANALYSIS DATE: 6/17/87 REVIEWED: DATE: 3/23/88

DATA ENTRY: P. PERKINS ENTRY DATE: 7/24/87 REVIEWED: DATE:

OFT9019X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07
GC/MS DATA FILE: 8691E31X2
MRI SAMPLE NO: 9016-19

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	500.0 NG
13C-1,2,3,7,8-HxCDF	500.0 NG
13C-OCDF	500.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	500.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2677	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	352590			NA
1694	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	276932	3.57		285.8
1785	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	57272	1.05		84.2
2333	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	42772	1.25		100.1
2948	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	128240	7.56		75.6
2204	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	58268800	498.42		99.7 *
2592	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	11394160	145.15		29.0 *
3187	13C-OCDF	454/456 (97/100)	454+456	1.972	2545060	100.62		20.1 *
1760	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	14405550	186.16		39.6 *
2705	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	4780860	90.71		18.1 *
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	23475282		292.990	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	8765907		81.740	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	2583776		33.045	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	683832		13.584	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	66796		2.936	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	1690072		16.954	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	1244023		14.863	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	815499		15.288	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	569244		20.454	
3179	OCTA-CDD	458/460 (87/100)	458+460	1.651	188792		8.916	

* = SURROGATE AREA OUT OF STANDARD CALIBRATION RANGE(SEE DILUTION ANALYZED 6/4/87)

GC/MS ANALYST: R. ROBSON	ANALYSIS DATE: 5/31/87	REVIEWED:	DATE: 9/4/87
DATA ANALYST: T. GRACE	ANALYSIS DATE: 6/3/87	REVIEWED: Mike Malloy	DATE: 9/8/87
DATA ENTRY: P. PERKINS	ENTRY DATE: 6/5/87	REVIEWED:	DATE:

DFT9020X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F02X8

MRI SAMPLE NO: 9020 COND

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	500.0 NG
13C-1,2,3,7,8-HxCDF	500.0 NG
13C-OCDF	500.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	500.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2675	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	486008			NA
1667	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	93804	0.88		70.2
1758	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	59604	0.79		63.6
2322	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	49864	1.06		84.7
2949	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	187530	8.03		80.3
2189	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	255932	1.88		0.4
2589	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	12063	0.11		0.02
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		0.0
1733	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	9989	0.12		0.03
2703	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	15794	0.20		0.04
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	38638		0.220	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	2004		0.016	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	1257		0.011	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	2526	ND<	0.034	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.162	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	11579	ND<	0.112	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	6598	ND<	0.068	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	5549	ND<	0.071	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	2513	ND<	0.062	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	1709	ND<	0.055	

GC/MS ANALYST:	D. MILLS	ANALYSIS DATE:	6/2/87	Entry REVIEWED:	DATE: 9/8/87
DATA ANALYST:	T. GRACE	ANALYSIS DATE:	6/9/87	REVIEWED: Mike	DATE: 9/8/87
DATA ENTRY:	P. PERKINS	ENTRY DATE:	6/15/87	REVIEWED:	DATE:

0FT902SX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF HRMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F10X6

MRI SAMPLE NO: 902S CYCLONE

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	5.00 NG
13C-1,2,3,7,8-HxCDF	5.00 NG
13C-OCDF	5.00 NG
13C-1,2,3,4-TCDD	4.70 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2666	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	544722			NA
1691	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	84653	0.71		56.6
1730	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	68896	0.82		65.6
2324	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	47156	0.89		71.4
2937	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	158704	6.06		60.6
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	ND	0.00		0.0
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		0.0
1755	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	24106	0.26		5.5
2693	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	16208	0.25		5.0
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	5058397		31.898	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	2236384		18.915	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	730814		7.553	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	215198		3.454	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	18119		0.644	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	531993		4.436	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	408921		4.431	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	436619		6.614	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	215338		6.252	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	82308		3.141	

GC/MS ANALYST: M. WICKHAM ANALYSIS DATE: 6/10/87

DATA ANALYST: T. GRACE ANALYSIS DATE: 6/15/87

DATA ENTRY: P. PERKINS ENTRY DATE: 6/15/87

REVIEWED: ______ DATE: 9/4/87

REVIEWED: Mike Molloy DATE: 9/3/87

REVIEWED: ______ DATE: ______

DFT9029X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691E29X2

MRI SAMPLE NO: 9026-29

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	5.00 NG
13C-1,2,3,7,8-HxCDF	5.00 NG
13C-OCDF	5.00 NG
13C-1,2,3,4-TCDD	4.70 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2684	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	609596			NA
1701	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	146788	1.10		87.6
1791	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	107322	1.14		91.3
2338	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	75948	1.29		102.8
2953	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	311426	10.63		106.3
2209	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	157791	0.76		15.2
2598	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	354597	1.86		37.2
3192	13C-OCDF	454/456 (87/100)	454+456	1.372	59710	0.97		19.4
1766	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	216099	1.49		31.7
2710	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	127515	1.00		19.9
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	26618412		96.801	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	11163457		58.625	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	3932025		20.708	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	976251		7.986	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	105283		1.906	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	2427109		12.993	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	1980917		13.329	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	1616076		12.476	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	849720		12.572	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	339824		6.609	

GC/MS ANALYST:	R. ROBSON	ANALYSIS DATE:	5/29/87	Entry REVIEWED:	DATE: 9/8/87
DATA ANALYST:	T. GRACE	ANALYSIS DATE:	6/2/87	REVIEWED: Mike Molloy	DATE: 9/8/87
DATA ENTRY:	P. PERKINS	ENTRY DATE:	6/3/87	REVIEWED:	DATE:

DFT9030X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F03X1

MRI SAMPLE NO: 9030 COMO

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	5.00 NG
13C-1,2,3,7,8-HxCDF	5.00 NG
13C-OCDF	5.00 NG
13C-1,2,3,4-TCDD	4.70 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2706	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	333466			NA
1717	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	79922	1.09		87.2
1809	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	55799	1.08		86.7
2362	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	39780	1.23		98.4
2976	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.491	143187	8.93		89.3
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	ND	0.00		0.0
NA	13C-OCDF	454/456 (87/100)	454+456	1.372	ND	0.00		0.0
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	ND	0.00		0.0
2735	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	3710	0.06		1.3
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	47166		0.315	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	11416		0.114	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	2745		0.031	
NA	TOTAL-HEPTA-CDF	408/410 (100/99)	408+410	3.925	2526	ND<	0.045	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.212	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	5789	ND<	0.060	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	6598	ND<	0.085	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	2513	ND<	0.042	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	1854	ND<	0.060	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	5374	ND<	0.227	

GC/MS ANALYST:	R. ROBSON	ANALYSIS DATE:	6/3/87	Entry REVIEWED:	L. Bakeri	DATE:	9/4/87
DATA ANALYST:	T. GRACE	ANALYSIS DATE:	6/9/87	REVIEWED:	Mike Molly	DATE:	9/8/87
DATA ENTRY:	P. PERKINS	ENTRY DATE:	6/15/87	REVIEWED:		DATE:	

DFT9035X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F10X7

MRI SAMPLE NO: 9035 CYCLONE

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2665	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	304744			NA
NA	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	ND	0.00		0.0
NA	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	ND	0.00		0.0
NA	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	ND	0.00		0.0
NA	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	ND	0.00		0.0
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	ND	0.00		0.0
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		0.0
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	ND	0.00		0.0
2694	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	4925	0.04		0.1
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	1750	ND<	0.025 *	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	1980	ND<	0.021 *	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	1665	ND<	0.009 *	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	1515	ND<	0.013 *	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.099 *	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	1737	ND<	0.026 *	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	1980	ND<	0.027 *	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	1665	ND<	0.013 *	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	5025	ND<	0.076 *	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	5374	ND<	0.107 *	

* = MDL DETERMINED USING 13C-1,2,3,6,7,8-HxCDD PEAK AREA

GC/MS ANALYST:	D. MILLS	ANALYSIS DATE:	6/10/87	Entry REVIEWED: [illegible]	DATE: 9/4/87
DATA ANALYST:	T. GRACE	ANALYSIS DATE:	6/15/87	REVIEWED: Mike [illegible]	DATE: 9/8/87
DATA ENTRY:	P. PERKINS	ENTRY DATE:	6/16/87	REVIEWED:	DATE:

DFT9036X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691E21X9

MRI SAMPLE NO: 9036 FILTER

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/13/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2717	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	785528			NA
1750	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.646	241470	1.16		92.9
1843	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.703	139644	1.04		83.5
2379	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.041	99204	1.21		97.1
2985	13C-1,2,3,4,6,7,8-HoCDD	436/438 (100/99)	436	0.508	256006	6.42		64.2
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.575	ND	0.00		0.0
2633	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.369	3254630	19.96		39.9
3228	13C-OCDF	454/456 (87/100)	454+456	2.224	456232	8.01		16.0
1817	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.792	3139880	15.68		33.4
2744	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.109	1198848	11.40		22.8
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.548	35244123		71.610	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.600	15201965		53.215	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.378	5416982		33.175	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	4.319	1428321		12.919	
NA	OCTA-CDF	442/444 (87/100)	442+444	2.054	96230		1.830	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.395	3144890		11.756	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.767	2687456		12.238	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.453	1995164		17.501	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.255	963442		16.688	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.733	257668		5.807	

GC/MS ANALYST:	D. MILLS	ANALYSIS DATE:	5/21/87	Entry REVIEWED:	DATE: 7/4/87
DATA ANALYST:	T. GRACE	ANALYSIS DATE:	5/28/87	REVIEWED:	DATE: 7/8/87
DATA ENTRY:	P. PERKINS	ENTRY DATE:	5/29/87	REVIEWED:	DATE:

DFT9037X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691E20X5

MRI SAMPLE NO: 9037 FRONT 1/2

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/13/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2717	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	736858			NA
1755	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.646	97062	0.50		39.8
1849	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.703	51060	0.41		32.6
2381	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.041	60398	0.79		63.0
2984	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.508	209916	5.61		56.1
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.575	ND	0.00		0.0
2634	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.369	170268	1.27		2.5
3227	13C-OCDF	454/456 (87/100)	454+456	2.224	22990	0.49		1.0
1823	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.792	239147	3.27		7.0
2745	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.109	56703	0.66		1.3
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.548	2755477		13.928	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.600	1104548		6.351	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.378	377822		2.822	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	4.319	86802		0.958	
NA	OCTA-CDF	442/444 (87/100)	442+444	2.054	2816		0.065	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.395	243752		2.492	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.767	205979		1.541	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.453	182843		1.956	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.255	87533		1.849	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.733	24703		0.679	

GC/MS ANALYST:	D. MILLS	ANALYSIS DATE:	5/20/87	REVIEWED:		DATE:	9/4/87
DATA ANALYST:	T. GRACE	ANALYSIS DATE:	5/27/87	REVIEWED:	Mike Molloy	DATE:	9/3/87
DATA ENTRY:	P. PERKINS	ENTRY DATE:	5/28/87	REVIEWED:		DATE:	

DFT9038X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF HRMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691E27X7

MRI SAMPLE NO: 9038 BACK 1/2

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2678	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	524224			NA
1695	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	87830	0.76		61.0
1785	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	57801	0.71		57.2
2333	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.369	47685	0.94		75.1
2949	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	161737	6.42		64.2
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
2594	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	16872	0.17		0.3
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		0.0
1761	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	12608	0.16		0.3
2705	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	14198	0.21		0.4
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	19074		0.116	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	34334		0.287	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	7473		0.076	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	1781		0.028	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.187	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	11579	ND<	0.115	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	1980	ND<	0.021	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	1665	ND<	0.025	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	2609	ND<	0.074	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	1307	ND<	0.049	

GC/MS ANALYST: D. MILLS ANALYSIS DATE: 5/27/87 REVIEWED: [illegible] DATE: 9/8/87

DATA ANALYST: T. GRACE ANALYSIS DATE: 5/31/87 REVIEWED: Mike Milby DATE: 9/8/87

DATA ENTRY: P. PERKINS ENTRY DATE: 6/1/87 REVIEWED:__________ DATE:______

DFT9039X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691E28X6

MRI SAMPLE NO: 9039 XAD

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2685	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	152733			NA
1706	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	35755	1.06		85.2
1797	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	21981	0.93		74.6
2344	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	16862	1.14		91.1
2952	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	52912	7.21		72.1
2212	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	2065088	44.81		89.6
2601	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	48823	1.51		3.0
3190	13C-OCDF	454/456 (87/100)	454+456	1.972	3367	0.32		0.6
1770	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	71893	2.42		5.2
2713	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	20893	0.96		1.9
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	1425776		21.286	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	423405		10.015	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	77672		2.408	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	11616		0.559	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.572	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	64170		1.677	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	21332		0.646	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	6969		0.317	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	5533		0.482	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	5374	ND<	0.615	

GC/MS ANALYST: R. ROBSON ANALYSIS DATE: 5/28/87 Entry REVIEWED: P. Perkins DATE: 9/4/87
DATA ANALYST: T. GRACE ANALYSIS DATE: 5/30/87 REVIEWED: Mike Malloy DATE: 9/9/87
DATA ENTRY: P. PERKINS ENTRY DATE: 6/2/87 REVIEWED:________ DATE:______

DFT9040X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F03X2

MRI SAMPLE NO: 9040 COMO

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2707	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	435360			NA
1716	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	103716	1.08		86.7
1807	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	65410	0.97		77.9
2363	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	48101	1.14		91.2
2977	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	163099	7.79		77.9
2231	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	25376	0.19		0.4
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	ND	0.00		0.0
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		0.0
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	ND	0.00		0.0
2734	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	9221	0.14		0.3
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	245388		1.263	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	52184		0.433	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	15089		0.152	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	2187		0.034	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.186	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	5789	ND<	0.051	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	6598	ND<	0.070	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	2547	ND<	0.038	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	3181	ND<	0.090	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	2687	ND<	0.100	

GC/MS ANALYST: R. ROBSON ANALYSIS DATE: 6/3/87

DATA ANALYST: T. GRACE ANALYSIS DATE: 6/9/87

DATA ENTRY: P. PERKINS ENTRY DATE: 6/15/87

REVIEWED: [illegible] DATE: 9/4/87

REVIEWED: Mike [illegible] DATE: 9/8/87

REVIEWED: ____________ DATE: ________

DFT9049X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8631L07

GC/MS DATA FILE: 8631E21X1

MRI SAMPLE NO: 9045-49 BT

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	NA
13C-1,2,3,7,8-HxCDF	NA
13C-OCDF	NA
13C-1,2,3,4-TCDD	NA
13C-1,2,3,7,8,9-HxCDD	NA

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/13/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2737	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	463246			NA
1756	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.646	183566	1.50		119.8
1659	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.703	144708	1.83		146.8
2398	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.041	78887	1.64		130.9
3006	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.508	222354	9.45		94.5
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.575	NA	NA		NA
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.369	NA	NA		NA
NA	13C-OCDF	454/456 (87/100)	454+456	2.229	NA	NA		NA
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.792	NA	NA		NA
NA	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.109	NA	NA		NA
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.548	115553		0.309	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.600	116160		0.511	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.378	29436		0.208	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	4.319	5358		0.056	
NA	OCTA-CDF	442/444 (87/100)	442+444	2.054	5374	NDK	0.118	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.395	5833	NDK	0.021	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.767	6598	NDK	0.038	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.453	12053		0.122	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.255	3922		0.198	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.733	9460		0.245	

GC/MS ANALYST:	R. ROBSON	ANALYSIS DATE:	5/21/87	Entered REVIEWED: P. Perkins	DATE: 8/10/87
DATA ANALYST:	T. GRACE	ANALYSIS DATE:	5/29/87	REVIEWED: Mike Molloy	DATE: 9/8/87
DATA ENTRY:	P. PERKINS	ENTRY DATE:	6/2/87	REVIEWED:	DATE:

DFT10005

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F10X8

MRI SAMPLE NO: 10005 CYCLONE

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.50 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.50 NG
13C-1,2,3,4,6,7,8-HPCDD	20.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	500.0 NG
13C-1,2,3,7,8-HxCDF	500.0 NG
13C-OCDF	500.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	500.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2658	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	424826			NA
NA	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	ND	0.00		0.0
NA	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	ND	0.00		0.0
2312	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	5844	0.14		5.7
NA	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	ND	0.00		0.0
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	336+388	6.121	ND	0.00		0.0
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		0.0
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	ND	0.00		0.0
2686	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	10009	0.06		.0
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	1750	ND<	0.018 *	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	1980	ND<	0.015 *	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	1665	ND<	0.006 *	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	1515	ND<	0.009 *	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.071 *	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	1737	ND<	0.019 *	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.146	1980	ND<	0.019 *	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	1665	ND<	0.009 *	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	1508	ND<	0.016 *	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	5374	ND<	0.077 *	

* = MDL DETERMINED USING 13C-1,2,3,6,7,8-HxCDD PEAK AREA

GC/MS ANALYST: D. MILLS ANALYSIS DATE: 6/10/87
DATA ANALYST: T. GRACE ANALYSIS DATE: 6/15/87
DATA ENTRY: P. PERKINS ENTRY DATE: 6/15/87

Entry REVIEWED: P. Perkins DATE: 9/8/87
REVIEWED: Mike Molloy DATE: 9/8/87
REVIEWED: ____________ DATE: ______

DF10009R

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(RIS))*(AMT.(RIS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F04X9

MRI SAMPLE NO: 10006-9 DF(1-50)

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.2 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	NA
13C-2,3,7,8-TCDD	NA
13C-1,2,3,7,8-PeCDD	NA
13C-1,2,3,4,6,7,8-HPCDD	NA

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	10.0 NG
13C-1,2,3,7,8-HxCDF	10.0 NG
13C-OCDF	10.0 NG
13C-1,2,3,4-TCDD	9.40 NG
13C-1,2,3,7,8,9-HxCDD	10.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(RIS))*AMT.(RIS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2669	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	317686			NA
NA	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198		NA		NA
NA	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543		NA		NA
NA	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969		NA		NA
NA	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481		NA		NA
2184	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.319	1182360	11.44		114.4
2584	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	2.950	194831	2.12		21.2
3183	13C-OCDF	454/456 (87/100)	454+456	0.953	33232	1.12		11.2
1729	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.589	235878	2.93		31.1
2697	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	1.978	66077	1.07		10.7
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342			NA	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134			NA	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097			NA	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925			NA	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774			NA	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176			NA	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446			NA	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160			NA	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170			NA	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651			NA	

GC/MS ANALYST:	D. MILLS	ANALYSIS DATE:	6/4/87	Entry REVIEWED:	DATE: 9/8/87
DATA ANALYST:	M. MOLLOY	ANALYSIS DATE:	6/17/87	REVIEWED:	DATE: 3/20/88
DATA ENTRY:	P. PERKINS	ENTRY DATE:	7/24/87	REVIEWED:	DATE:

DFT10009

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07
GC/MS DATA FILE: 8691E31X3
MRI SAMPLE NO: 10006-09

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	500.0 NG
13C-1,2,3,7,8-HxCDF	500.0 NG
13C-OCDF	500.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	500.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2682	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	507920			NA
1697	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	430480	3.86		308.4
1787	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	74747	0.95		76.3
2338	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	49364	1.00		80.2
2954	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	189563	7.76		77.6
2207	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	80401300	595.90		119.2 *
2597	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	15793910	136.12		27.2 *
3194	13C-OCDF	454/456 (87/100)	454+456	1.972	3399910	90.94		18.2 *
1762	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	19253070	190.64		40.6 *
2710	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	5735890	73.62		14.7 *
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	23954191		29.704	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	9444080		76.304	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	2931394		25.363	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	673848		9.056	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	49496		1.472	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	1075303		8.265	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	896472		9.280	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	585833		7.430	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	374164		9.095	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	5374		0.172	

* = SURROGATE AREA OUT OF STANDARD CALIBRATION RANGE(SEE DILUTION ANALYZED 6/4/87)

GC/MS ANALYST:	R. ROBSON	ANALYSIS DATE:	5/31/87	REVIEWED:	DATE: 9/4/87
DATA ANALYST:	T. GRACE	ANALYSIS DATE:	6/4/87	REVIEWED: Mike Milloy	DATE: 9/9/87
DATA ENTRY:	P. PERKINS	ENTRY DATE:	6/4/87	REVIEWED:	DATE:

DFT10010

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F03X4

MRI SAMPLE NO: 10010 COMB

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	500.0 NG
13C-1,2,3,7,8-HxCDF	500.0 NG
13C-OCDF	500.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	500.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2707	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	441756			NA
1716	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	97228	1.00		80.1
1807	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	61024	0.90		71.6
2362	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	46755	1.09		87.3
2978	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	158924	7.48		74.8
2230	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	192387	1.51		0.3
2622	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	41714	0.43		0.1
3219	13C-OCDF	454/456 (87/100)	454+456	1.972	2469	0.08		0.02
1780	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	32107	0.39		0.1
2736	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	24071	0.37		0.1
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	282690		1.552	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	128119		1.093	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	16334		0.169	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	3179		0.051	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.191	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	2895	ND<	0.027	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	3299	ND<	0.036	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	5549	ND<	0.084	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+425	2.170	2985	ND<	0.087	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	2687	ND<	0.102	

GC/MS ANALYST: R. ROBSON
ANALYSIS DATE: 6/3/87

DATA ANALYST: T. GRACE
ANALYSIS DATE: 6/10/87

DATA ENTRY: P. PERKINS
ENTRY DATE: 6/12/87

Entry REVIEWED: P. Perkins DATE: 9/4/87

REVIEWED: Mike Molloy DATE: 9/8/87

REVIEWED:________________ DATE:________

DFT10015

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07
GC/MS DATA FILE: 8691F10X9
MRI SAMPLE NO: 10015 CYCLONE

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.50 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.50 NG
13C-1,2,3,4,6,7,8-HPCDD	20.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	500.0 NG
13C-1,2,3,7,8-HxCDF	500.0 NG
13C-OCDF	500.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	500.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2666	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	392752			NA
NA	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	ND	0.00		0.0
NA	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	ND	0.00		0.0
2327	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	6042	0.16		6.3
NA	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	ND	0.00		0.0
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	ND	0.00		0.0
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		0.0
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	ND	0.00		0.0
2695	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	6737	0.04		0.01
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	1750	ND<	0.019 *	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	2639	ND<	0.021 *	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	1665	ND<	0.007 *	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	1515	ND<	0.010 *	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.077 *	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	2316	ND<	0.027 *	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	1980	ND<	0.021 *	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	1665	ND<	0.010 *	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	5025	ND<	0.059 *	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	5374	ND<	0.083 *	

* = MDL DETERMINED USING 13C-1,2,3,6,7,8-HxCDD PEAK AREA

GC/MS ANALYST: D. MILLS ANALYSIS DATE: 6/10/87 Entry REVIEWED: P. Perkins DATE: 9/4/87
DATA ANALYST: T. GRACE ANALYSIS DATE: 6/15/87 REVIEWED: Mike Molloy DATE: 9/8/87
DATA ENTRY: P. PERKINS ENTRY DATE: 6/16/87 REVIEWED:________________ DATE:________

DF10019R

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(RIS))*(AMT.(RIS)/RF)

PROJECT NO: 8691L07
GC/MS DATA FILE: 8691F05X2
MRI SAMPLE NO: 10016-19 DF(1-50)

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD 10.2 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF NA
13C-2,3,7,8-TCDD NA
13C-1,2,3,7,8-PeCDD NA
13C-1,2,3,4,6,7,8-HPCDD NA

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF 10.0 NG
13C-1,2,3,7,8-HxCDF 10.0 NG
13C-OCDF 10.0 NG
13C-1,2,3,4-TCDD 9.40 NG
13C-1,2,3,7,8,9-HxCDD 10.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(RIS))*AMT.(RIS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2675	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	429852			NA
NA	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198		NA		NA
NA	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543		NA		NA
NA	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969		NA		NA
NA	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481		NA		NA
2198	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.319	1493584	10.68		106.8
2591	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	385+388	2.950	160349	1.29		12.9
3186	13C-OCDF	454/456 (87/100)	454+456	0.953	27363	0.68		6.8
1752	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.589	201542	1.85		19.7
2704	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	1.978	59359	0.71		7.1
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342			NA	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134			NA	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097			NA	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925			NA	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774			NA	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176			NA	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446			NA	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160			NA	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170			NA	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651			NA	

GC/MS ANALYST: R. ROBSON ANALYSIS DATE: 6/5/87 Entry REVIEWED: L. Perkins DATE: 9/4/87
DATA ANALYST: M. MOLLOY ANALYSIS DATE: 6/17/87 REVIEWED: Mike Molloy DATE: 9/8/87
DATA ENTRY: P. PERKINS ENTRY DATE: 7/24/87 REVIEWED:________ DATE:______

OFT10019

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07
GC/MS DATA FILE: 8691E31X4
MRI SAMPLE NO: 10016-19

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	500.0 NG
13C-1,2,3,7,8-HxCDF	500.0 NG
13C-OCDF	500.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	500.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2677	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	497904			NA
1694	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	354024	3.23		258.7
1785	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	30348	0.39		31.6
2332	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	29538	0.61		49.0
2948	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	84756	3.54		35.4
2203	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	73657200	912.34		182.5 *
2592	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	9669200	186.38		37.3 *
3198	13C-OCDF	454/456 (87/100)	454+456	1.972	1817672	108.74		21.7 *
1759	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	12590320	307.05		65.3 *
2704	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	3075680	88.30		17.7 *
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	19038062		28.706	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	7539741		101.806	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	2203858		42.647	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	555206		16.688	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	34848		2.317	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	779922		14.765	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	677973		11.729	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	403238		11.438	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	257804		14.016	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	5374	ND<	0.384	

* = SURROGATE AREA OUT OF STANDARD CALIBRATION RANGE(SEE DILUTION ANALYZED 6/4/87)

GC/MS ANALYST: K. THORNBURG ANALYSIS DATE: 5/31/87 Entry REVIEWED: P. Perkins DATE: 9/4/87
DATA ANALYST: T. GRACE ANALYSIS DATE: 6/4/87 REVIEWED: Mike Molloy DATE: 9/18/87
DATA ENTRY: P. PERKINS ENTRY DATE: 6/5/87 REVIEWED:________________ DATE:________

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DFT10020

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F03X5

MRI SAMPLE NO: 10020 COND

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	500.0 NG
13C-1,2,3,7,8-HxCDF	500.0 NG
13C-OCDF	500.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	500.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2710	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	377558			NA
1720	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	91365	1.10		88.1
1811	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	66199	1.14		90.9
2366	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	43885	1.20		95.9
2980	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	170040	9.37		93.7
2235	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	54432	0.45		0.09
2625	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	10619	0.10		0.02
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		0.00
1786	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	5578	0.06		0.01
2739	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	10766	0.15		0.03
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	18400		0.108	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	3299	ND<	0.030	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	1066		0.010	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	2526	ND<	0.038	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.178	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	5789	ND<	0.050	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	6598	ND<	0.077	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	2774	ND<	0.039	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	2513	ND<	0.068	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	1790	ND<	0.064	

GC/MS ANALYST:	R. ROBSON	ANALYSIS DATE:	6/3/87	Entry REVIEWED: P. Perkins	DATE: 9/8/87
DATA ANALYST:	T. GRACE	ANALYSIS DATE:	6/10/87	REVIEWED: Mike Malloy	DATE: 9/8/87
DATA ENTRY:	P. PERKINS	ENTRY DATE:	6/12/87	REVIEWED:	DATE:

DFT10020

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F03X5

MRI SAMPLE NO: 10020 COND

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	500.0 NG
13C-1,2,3,7,8-HxCDF	500.0 NG
13C-OCDF	500.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	500.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2710	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	377558			NA
1720	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	91365	1.10		88.1
1811	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	66199	1.14		90.9
2366	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	43885	1.20		95.9
2980	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	170040	9.37		93.7
2235	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	54432	0.45		0.09
2625	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	10619	0.10		0.02
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		0.00
1786	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	5578	0.06		0.01
2739	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	10766	0.15		0.03
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	18400		0.108	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	3299	ND<	0.030	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	1066		0.010	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	2526	ND<	0.038	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.178	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	5789	ND<	0.050	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	6598	ND<	0.077	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	2774	ND<	0.039	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	2513	ND<	0.068	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	1790	ND<	0.064	

GC/MS ANALYST: R. ROBSON   ANALYSIS DATE: 6/3/87   Entry REVIEWED: P. Perkins DATE: 9/4/87

DATA ANALYST: T. GRACE   ANALYSIS DATE: 6/10/87   REVIEWED: Mike Molloy DATE: 9/8/87

DATA ENTRY: P. PERKINS   ENTRY DATE: 6/12/87   REVIEWED: ______ DATE: ______

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DFT10025

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F10X10

MRI SAMPLE NO: 10025 CYCLONE

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2666	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	395544			NA
NA	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	ND	0.00		0.0
NA	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	ND	0.00		0.0
2324	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	6102	0.16		12.7
NA	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	ND	0.00		0.0
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	ND	0.00		0.0
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		0.0
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	ND	0.00		0.0
2696	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	6450	0.04		0.1
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	2342		0.025 *	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	2639	ND<	0.021 *	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	1665	ND<	0.007 *	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	1515	ND<	0.010 *	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.077 *	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	2895	ND<	0.034 *	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	1980	ND<	0.020 *	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	1665	ND<	0.010 *	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	5025	ND<	0.059 *	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	5374	ND<	0.082 *	

* = MDL DETERMINED USING 13C-1,2,3,6,7,8-HxCDD PEAK AREA

GC/MS ANALYST: D. MILLS	ANALYSIS DATE: 6-10-87	Entry REVIEWED: P. Parkins	DATE: 9/4/87
DATA ANALYST: T. GRACE	ANALYSIS DATE: 6-15-87	REVIEWED: Mike Molloy	DATE: 9/3/87
DATA ENTRY: M. WHITACRE	ENTRY DATE: 6-15-87	REVIEWED:	DATE:

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DFT10029

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691E30X1

MRI SAMPLE NO: 10026-10029

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2677	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	485308			NA
1694	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	143580	1.35		107.7
1785	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	86591	1.16		92.5
2333	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	62587	1.33		106.4
2946	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	248691	10.66		106.6
2202	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	8941720	52.27		104.5
2592	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	1395340	9.17		18.3
3182	13C-OCDF	454/456 (87/100)	454+456	1.972	310052	6.32		12.6
1759	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	1418146	12.12		25.8
2705	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	525136	5.14		10.3
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	18126762		67.393	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	8008091		51.032	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	2496053		16.462	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	672051		6.884	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	45886		1.040	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	1115069		7.398	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	792551		6.471	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	496580		4.801	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	330190		6.118	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	132860		3.236	

GC/MS ANALYST:	K. THORNBURG	ANALYSIS DATE:	5-30-87	Eng REVIEWED:	DATE: 9/4/87
DATA ANALYST:	T. GRACE	ANALYSIS DATE:	6-15-87	REVIEWED: Mike Molloy	DATE: 9/8/87
DATA ENTRY:	M.WHITACRE	ENTRY DATE:	6-17-87	REVIEWED:	DATE:

DFT10030

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07
GC/MS DATA FILE: 8691F03X6
MRI SAMPLE NO: 10030 COND

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2707	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	397652			NA
1715	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	80641	0.92		73.8
1806	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	42412	0.69		55.3
2363	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	39010	1.01		81.0
2978	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	106658	5.58		55.8
2234	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	10534	0.10		0.2
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	ND	0.00		0.0
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		0.0
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	ND	0.00		0.0
2735	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	4405	0.10		0.2
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	86966		0.576	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	16320		0.167	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	2774	ND<	0.043	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	2526	ND<	0.060	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.284	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	5789	ND<	0.078	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	6598	ND<	0.086	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	2774	ND<	0.063	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	1960	ND<	0.085	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	5374	ND<	0.305	

GC/MS ANALYST: R. ROBSON
ANALYSIS DATE: 6/3/87
DATA ANALYST: T. GRACE
ANALYSIS DATE: 6/10/87
DATA ENTRY: P. PERKINS
ENTRY DATE: 6/12/87

Entry REVIEWED: DATE: 9/8/87
REVIEWED: Mike Molloy DATE: 9/9/87
REVIEWED: ________ DATE: ________

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DFT10035

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F10X11

MRI SAMPLE NO: 10035 CYCLONE

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	5.00 NG
13C-1,2,3,7,8-HxCDF	5.00 NG
13C-OCDF	5.00 NG
13C-1,2,3,4-TCDD	4.70 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2665	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	464180			NA
1691	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	24779	0.24		19.4
1793	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	19326	0.27		21.6
2324	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	19670	0.44		35.0
2937	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	36249	1.62		16.2
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
2582	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	38325	1.73		34.5
3175	13C-OCDF	454/456 (87/100)	454+456	1.972	10536	1.47		29.5
1757	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	31454	1.20		25.6
2694	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	16877	1.13		22.7
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	6697785		144.289	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	2645672		53.645	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	809726		36.637	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	203246		14.284	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	11678		1.816	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	377295		11.216	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	332876		8.648	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	289005		19.168	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	172492		21.926	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	74724		12.485	

GC/MS ANALYST: D. MILLS   ANALYSIS DATE: 6-10-87   Entry REVIEWED: P Perkins DATE: 9/4/87

DATA ANALYST: T. GRACE   ANALYSIS DATE: 6-16-87   REVIEWED: Mike Molloy DATE: 9/3/87

DATA ENTRY: M. WHITACRE   ENTRY DATE: 6-16-87   REVIEWED:____________ DATE:________

DFT10039

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691E29X3

MRI SAMPLE NO: 10036-39

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	5.00 NG
13C-1,2,3,7,8-HxCDF	5.00 NG
13C-OCDF	5.00 NG
13C-1,2,3,4-TCDD	4.70 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2687	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	425566			NA
1704	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	117737	1.26		100.7
1796	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	72752	1.11		88.6
2344	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	54400	1.32		105.5
2957	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	211567	10.34		103.4
2213	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	429822	2.89		57.8
2602	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	117246	0.91		18.1
3195	13C-OCDF	454/456 (87/100)	454+456	1.972	19224	0.44		8.7
1770	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	111501	1.13		24.1
2714	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	42925	0.49		9.9
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	13049492		59.165	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	5441375		39.894	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	1803170		13.979	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	449993		5.418	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	30837		0.822	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	781259		6.170	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	582522		5.472	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	445741		5.065	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	233772		5.091	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	89172		2.553	

GC/MS ANALYST: R. ROBSON ANALYSIS DATE: 5/29/87 Entry REVIEWED: DATE: 9/4/87

DATA ANALYST: T. GRACE ANALYSIS DATE: 6/2/87 REVIEWED: Mike Molloy DATE: 9/8/87

DATA ENTRY: P. PERKINS ENTRY DATE: 6/3/87 REVIEWED:__________ DATE:______

DFT10040

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07
GC/MS DATA FILE: 8691F03X7
MRI SAMPLE NO: 10040 COND

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	5.00 NG
13C-1,2,3,7,8-HxCDF	5.00 NG
13C-OCDF	5.00 NG
13C-1,2,3,4-TCDD	4.70 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2706	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	311744			NA
1718	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	73925	1.08		86.3
1903	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	41812	0.87		69.5
2363	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	31212	1.03		82.6
2976	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	88122	5.88		58.8
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
NA	13C-1,2,3,4,7,8-HxCDF	396/398 (100/82)	386+388	6.121	ND	0.00		0.0
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		0.0
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	ND	0.00		0.0
2732	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	4268	0.12		2.4
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	78812		0.569	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	33170		0.424	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	1347		0.025	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	2526	ND<	0.073	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.344	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	2895	ND<	0.040	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	3299	ND<	0.054	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	2774	ND<	0.076	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	2513	ND<	0.131	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	5374	ND<	0.369	

GC/MS ANALYST: R. ROBSON ANALYSIS DATE: 6/3/87 Entry REVIEWED: DATE: 9/4/87
DATA ANALYST: T. GRACE ANALYSIS DATE: 6/10/87 REVIEWED: Mike Molloy DATE: 9/8/87
DATA ENTRY: P. PERKINS ENTRY DATE: 6/12/87 REVIEWED: DATE:

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DFT10049

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691E27X1

MRI SAMPLE NO: 10045-49 BT

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	NA
13C-1,2,3,7,9-HxCDF	NA
13C-OCDF	NA
13C-1,2,3,4-TCDD	NA
13C-1,2,3,7,8,9-HxCDD	NA

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2685	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	179598			NA
1702	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	52815	1.34		107.0
1794	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	29650	1.07		85.6
2343	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	25530	1.47		117.3
2954	13C-1,2,3,4,6;7,8-HpCDD	436/438 (100/99)	436	0.481	83814	9.71		97.1
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	NA	NA		NA
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	NA	NA		NA
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	NA	NA		NA
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	NA	NA		NA
NA	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	NA	NA		NA
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	28618		0.289	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	4856		0.076	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	1665	ND<	0.033	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	2020	ND<	0.061	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.361	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	5789	ND<	0.112	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	6598	ND<	0.132	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	1665	ND<	0.048	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	2010	ND<	0.111	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	3224	ND<	0.233	

GC/MS ANALYST: R. ROBSON ANALYSIS DATE: 5/27/87 ENTRIES REVIEWED: C. CASSADY DATE: 6/3/87

DATA ANALYST: T. GRACE ANALYSIS DATE: 5/31/87 REVIEWED: MBS DATE: 8/10/87

DATA ENTRY: P. PERKINS ENTRY DATE: 6/2/87 REVIEWED:________ DATE:______

DFT11005

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07
GC/MS DATA FILE: 8691F08X4
MRI SAMPLE NO: 11005 CYCLONE

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.50 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.50 NG
13C-1,2,3,4,6,7,8-HPCDD	20.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	500.0 NG
13C-1,2,3,7,8-HxCDF	500.0 NG
13C-OCDF	500.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	500.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2678	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	301848			NA
1693	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	45052	0.68		27.2
1785	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	18293	0.39		15.7
2335	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	18117	0.62		24.8
2948	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	61086	4.21		21.0
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
2593	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	340872	18.23		3.6
3188	13C-OCDF	454/456 (87/100)	454+456	1.972	55593	9.23		1.8
1758	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	681680	55.16		11.7
2705	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	30983	7.25		1.4
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	1710846		40.543	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	710125		31.266	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	209136		11.230	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	40655		3.391	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	2687	ND<	0.496	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	84208		5.289	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	96221		5.428	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	50529		3.977	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	50105		7.559	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	21117		4.187	

GC/MS ANALYST:	R. ROBSON	ANALYSIS DATE:	6/8/87	REVIEWED:	DATE: 9/4/87
DATA ANALYST:	T. GRACE	ANALYSIS DATE:	6/10/87	REVIEWED: Mike Malley	DATE: 9/8/87
DATA ENTRY:	P. PERKINS	ENTRY DATE:	6/11/87	REVIEWED:	DATE:

DF11009R

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(RIS))*(AMT.(RIS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F05X1

MRI SAMPLE NO: 11006-9 DF(1-50)

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.2 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	NA
13C-2,3,7,8-TCDD	NA
13C-1,2,3,7,8-PeCDD	NA
13C-1,2,3,4,6,7,8-HPCDD	NA

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	10.0 NG
13C-1,2,3,7,8-HxCDF	10.0 NG
13C-OCDF	10.0 NG
13C-1,2,3,4-TCDD	9.40 NG
13C-1,2,3,7,8,9-HxCDD	10.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(RIS))*AMT.(RIS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2673	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	405572			NA
NA	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198		NA		NA
NA	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543		NA		NA
NA	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969		NA		NA
NA	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.491		NA		NA
2197	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.319	2156392	16.34		163.4
2588	13C-1,2,3,4,7,8-HxCDF	386/398 (100/82)	386+388	2.950	118600	1.01		10.1
3184	13C-OCDF	454/456 (87/100)	454+456	0.953	28202	0.74		7.4
1752	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.589	148957	1.45		15.4
2702	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	1.978	49070	0.62		6.2
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342			NA	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134			NA	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097			NA	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925			NA	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774			NA	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176			NA	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446			NA	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160			NA	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170			NA	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651			NA	

GC/MS ANALYST:	R. ROBSON	ANALYSIS DATE:	6/5/87	Entry REVIEWED:	DATE: 9/4/87
DATA ANALYST:	M. MOLLOY	ANALYSIS DATE:	6/17/87	REVIEWED: Mike Molloy	DATE: 9/8/87
DATA ENTRY:	P. PERKINS	ENTRY DATE:	7/24/87	REVIEWED:	DATE:

DFT11009

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF HRMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691E31XS

MRI SAMPLE NO: 11006-09

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	500.0 NG
13C-1,2,3,7,8-HxCDF	500.0 NG
13C-OCDF	500.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	500.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2678	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	396358			NA
1693	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	1042870	11.97		957.5
1787	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	8049	0.13		10.5
2334	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	24776	0.64		51.6
2948	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	76310	4.00		40.0
2204	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	88257000	1303.29		260.7 *
2592	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	6022860	128.94		25.8 *
3188	13C-OCDF	454/456 (87/100)	454+456	1.972	1201580	79.84		16.0 *
1758	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	8576540	788.62		167.8 *
2705	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	1954286	62.31		12.5 *
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	10285415		5.265	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	4305958		69.316	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	1240345		26.659	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	330119		11.021	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	24283		1.794	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	556546		39.726	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	492302		10.154	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	320658		10.102	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	235474		14.219	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	48897		3.881	

* = SURROGATE AREA OUT OF STANDARD CALIBRATION RANGE(SEE DILUTION ANALYZED 6/4/87)

GC/MS ANALYST: K. THORNBURG ANALYSIS DATE: 5/31/87 Entry REVIEWED: P. Perkins DATE: 9/4/87

DATA ANALYST: T. GRACE ANALYSIS DATE: 6/5/87 REVIEWED: Mike Dolley DATE: 9/3/87

DATA ENTRY: P. PERKINS ENTRY DATE: 6/5/87 REVIEWED:________ DATE:______

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OFT11010

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F04X1

MRI SAMPLE NO: 11010 CONDENSATE

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	500 NG
13C-1,2,3,7,8-HxCDF	500 NG
13C-OCDF	500 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	500 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2675	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	351130			NA
1688	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	96346	1.25		99.8
1778	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	57364	1.06		84.7
2331	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	44433	1.31		104.4
2946	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	173374	10.27		102.7
2200	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	168642	1.39		0.3
2591	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	6013	0.06		.0
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	NA	0.00		0.0
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	NA	0.00		0.0
2703	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	9401	0.13		.0
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	2917	ND<	0.016	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	7540		0.068	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	2774	ND<	0.026	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	1515	ND<	0.022	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.175	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	5789	ND<	0.058	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	3299	ND<	0.038	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	2774	ND<	0.038	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	1508	ND<	0.040	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	2687	ND<	0.094	

GC/MS ANALYST:	R. ROBSON	ANALYSIS DATE:	6-4-87	REVIEWED:	DATE: 9/4/87
DATA ANALYST:	T. GRACE	ANALYSIS DATE:	6-10-87	REVIEWED: Mike Molloy	DATE: 9/3/87
DATA ENTRY:	M.WHITACRE	ENTRY DATE:	6-17-87	REVIEWED:	DATE:

DFT11015

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F08X5

MRI SAMPLE NO: 11015 CYCLONE

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	5.00 NG
13C-1,2,3,7,8-HxCDF	5.00 NG
13C-OCDF	5.00 NG
13C-1,2,3,4-TCDD	4.70 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2675	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	312836			NA
1688	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	75496	1.10		87.8
1779	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	49091	1.02		81.3
2330	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	34609	1.14		91.3
2945	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	126038	8.38		83.8
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	ND	0.00		0.0
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		0.0
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	ND	0.00		0.0
2704	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	5192	0.10		2.0
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	2137740		15.115	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	955316		11.009	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	275257		3.582	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	89101		1.801	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	4271		0.191	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	122193		1.430	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	103833		1.533	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	112821		2.152	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	86209		3.152	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	32032		1.539	

GC/MS ANALYST:	R. ROBSON	ANALYSIS DATE:	6/8/87	Entry REVIEWED:	P. Perkins	DATE:	9/4/87
DATA ANALYST:	T. GRACE	ANALYSIS DATE:	6/10/87	REVIEWED:		DATE:	9/3/87
DATA ENTRY:	P. PERKINS	ENTRY DATE:	6/11/87	REVIEWED:		DATE:	

DFT11019

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691E29X4

MRI SAMPLE NO: 11016-19

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	5.00 NG
13C-1,2,3,7,8-HxCDF	5.00 NG
13C-OCDF	5.00 NG
13C-1,2,3,4-TCDD	4.70 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2685	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	519966			NA
1697	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	63688	0.56		44.6
1789	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	16877	0.21		16.8
2341	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	21807	0.43		34.6
2955	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	65609	2.62		26.2
2209	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	3398700	57.02		1140.4
2600	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	70660	1.76		35.2
3194	13C-OCDF	454/456 (87/100)	454+456	1.972	5212	0.40		8.1
1763	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	66212	2.90		61.8
2713	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	26543	0.98		19.7
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	10934425		91.649	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	4161187		76.106	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	1315032		32.974	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	323896		12.576	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	19958		1.715	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	794725		27.054	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	504663		11.826	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	494092		18.105	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	231416		16.253	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	87207		8.050	

GC/MS ANALYST: R. ROBSON ANALYSIS DATE: 5/29/87 Entry REVIEWED: ____ DATE: 9/8/87

DATA ANALYST: T. GRACE ANALYSIS DATE: 6/3/87 REVIEWED: Mike Molloy DATE: 9/8/87

DATA ENTRY: P. PERKINS ENTRY DATE: 6/4/87 REVIEWED: ____ DATE: ____

DFT11020

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F04X2

MRI SAMPLE NO: 11020 CONDENSATE

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	5.00 NG
13C-1,2,3,7,8-HxCDF	5.00 NG
13C-OCDF	5.00 NG
13C-1,2,3,4-TCDD	4.70 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2676	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	414276			NA
1689	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	97772	1.07		85.9
1778	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	61338	0.96		76.8
2331	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	41141	1.02		82.0
2946	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	152136	7.64		76.4
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	NA	0.00		0.0
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	NA	0.00		0.0
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	NA	0.00		0.0
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	NA	0.00		0.0
NA	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	NA	0.00		0.0
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	20484		0.112	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	7140		0.069	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	1110	ND<	0.012	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	1515	ND<	0.025	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.199	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	5789	ND<	0.054	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	3299	ND<	0.041	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	1665	ND<	0.026	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	5025	ND<	0.152	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	1612	ND<	0.064	

GC/MS ANALYST: R. ROBSON ANALYSIS DATE: 6-4-87 Entry REVIEWED: DATE: 9/8/87

DATA ANALYST: T. GRACE ANALYSIS DATE: 6-11-87 REVIEWED: Mike Malloy DATE: 9/9/87

DATA ENTRY: M.WHITACRE ENTRY DATE: 6-17-87 REVIEWED:__________ DATE:______

OFT1102S

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F08X6

MRI SAMPLE NO: 1102S CYCLONE

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.50 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.50 NG
13C-1,2,3,4,6,7,8-HPCDD	20.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	500.0 NG
13C-1,2,3,7,8-HxCDF	500.0 NG
13C-OCDF	500.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	500.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2670	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	419416			NA
1667	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	189370	2.05		82.2
1757	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	135710	2.10		83.9
2319	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	89751	2.21		88.3
2943	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	406654	20.17		100.8
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
2583	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	1499512	12.05		2.4
3183	13C-OCDF	454/456 (87/100)	454+456	1.372	403912	10.07		2.0
1732	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	1658080	18.09		3.8
2698	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	587956	7.04		1.4
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	3805760		21.456	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	1590942		14.140	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	558536		4.505	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	174139		2.182	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	11588		0.321	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	248350		2.103	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	239637		2.729	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	148576		1.757	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	157836		3.577	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	48220		1.436	

GC/MS ANALYST:	D. MILLS	ANALYSIS DATE:	6/8/87	Entry REVIEWED:	DATE: 9/4/87
DATA ANALYST:	T. GRACE	ANALYSIS DATE:	6/10/87	REVIEWED: Mike Fralley	DATE: 9/8/87
DATA ENTRY:	P. PERKINS	ENTRY DATE:	6/11/87	REVIEWED:	DATE:

DF11029R

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(RIS))*(AMT.(RIS)/RF)

PROJECT NO: 8691L07
GC/MS DATA FILE: 8691F05X3
MRI SAMPLE NO: 11026-29 DF(1-50)

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.2 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	NA
13C-2,3,7,8-TCDD	NA
13C-1,2,3,7,8-PeCDD	NA
13C-1,2,3,4,6,7,8-HPCDD	NA

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	0.5 NG
13C-1,2,3,7,8-HxCDF	10.0 NG
13C-OCDF	10.0 NG
13C-1,2,3,4-TCDD	9.49 NG
13C-1,2,3,7,8,9-HxCDD	10.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(RIS))*AMT.(RIS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2574	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	370478			NA
NA	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198		NA		NA
NA	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543		NA		NA
NA	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969		NA		NA
NA	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481		NA		NA
2197	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.319	156421	1.30		259.5
2589	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	2.950	143309	1.34		13.4
3186	13C-OCDF	454/456 (87/100)	454+456	0.953	30363	0.88		8.8
1750	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.589	176683	1.88		20.0
2702	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	1.978	60799	0.85		8.5
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342			NA	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134			NA	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097			NA	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925			NA	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774			NA	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176			NA	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446			NA	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160			NA	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170			NA	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651			NA	

GC/MS ANALYST:	R. ROBSON	ANALYSIS DATE:	6/5/87	REVIEWED:	DATE: 11/11/87
DATA ANALYST:	M. MOLLOY	ANALYSIS DATE:	6/17/87	REVIEWED:	DATE: 3/20/89
DATA ENTRY:	P. PERKINS	ENTRY DATE:	7/24/87	REVIEWED:	DATE:

DFT11029

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691E31X6

MRI SAMPLE NO: 11026-29

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	500.0 NG
13C-1,2,3,7,8-HxCDF	500.0 NG
13C-OCDF	500.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	500.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2677	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	418814			NA
1691	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	130553	1.42		113.4
1792	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	57960	0.90		71.7
2332	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	43258	1.07		85.2
2947	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	147958	7.35		73.5
2201	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	9942610	84.09		16.8 *
2591	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	8186610	90.39		18.1 *
3187	13C-OCDF	454/456 (87/100)	454+456	1.972	1798652	61.64		12.3 *
1757	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	10760880	137.41		29.2 *
2703	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	3074540	50.56		10.1 *
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	17187424		70.277	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	6276312		57.868	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	1772632		19.650	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	484672		8.345	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	36770		1.401	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	1104330		10.947	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	757817		8.952	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	487670		7.924	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	402830		12.545	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	5374	ND<	0.220	

* = SURROGATE AREA OUT OF STANDARD CALIBRATION RANGE(SEE DILUTION ANALYZED 6/4/87)

GC/MS ANALYST:	K. THORNBURG	ANALYSIS DATE:	5/31/87	REVIEWED:	P. Perkins	DATE:	9/4/87
DATA ANALYST:	T. GRACE	ANALYSIS DATE:	6/5/87	REVIEWED:	Mike Molloy	DATE:	9/9/87
DATA ENTRY:	P. PERKINS	ENTRY DATE:	6/5/87	REVIEWED:		DATE:	

DFT11030

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F04X3

MRI SAMPLE NO: 11030 CONDENSATE

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.50 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.50 NG
13C-1,2,3,4,6,7,8-HPCDD	20.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	500 NG
13C-1,2,3,7,8-HxCDF	500 NG
13C-OCDF	500 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	500 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2677	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	373268			NA
1691	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	102982	1.25		50.2
1780	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	66366	1.15		46.1
2333	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	47102	1.30		52.1
2946	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	174914	9.75		48.7
2201	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	298503	4.64		0.9
2593	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	15981	0.30		0.1
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	NA	0.00		0.0
1755	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	44726	1.00		0.2
2705	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	11193	0.31		0.1
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	127937		1.326	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	2093472		35.453	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	9850		0.185	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	1515	ND<	0.044	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.346	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	5789	ND<	0.100	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	6598	ND<	0.143	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	1665	ND<	0.046	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	2513	ND<	0.132	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	2687	ND<	0.186	

GC/MS ANALYST: R. ROBSON ANALYSIS DATE: 6-4-87
DATA ANALYST: T. GRACE ANALYSIS DATE: 6-11-87
DATA ENTRY: M. WHITACRE ENTRY DATE: 6-16-87

Entry REVIEWED: ____________ DATE: 9/8/87
REVIEWED: Mike Trolling DATE: 9/8/87
REVIEWED: ____________ DATE: ______

DFT11035

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F11X1

MRI SAMPLE NO: 11035 CYCLONE

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2690	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	664488			NA
NA	13C-2,3,7,8-TCDF	316/318 (75/100)	316	2.198	ND	0.00		0.0
NA	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	ND	0.00		0.0
2349	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.369	12199	0.19		15.2
NA	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	ND	0.00		0.0
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	ND	0.00		0.0
NA	13C-OCDF	454/456 (87/100)	454+456	1.372	ND	0.00		0.0
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	ND	0.00		0.0
2718	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	11594	0.04		0.1
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	1750	ND<	0.011 *	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	1980	ND<	0.010 *	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	1665	ND<	0.004 *	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	1515	ND<	0.006 *	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.046 *	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	1737	ND<	0.012 *	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	1980	ND<	0.012 *	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	1665	ND<	0.006 *	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	5025	ND<	0.035 *	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	1612	ND<	0.015 *	

* = MDL DETERMINED USING 13C-1,2,3,6,7,8-HxCDD PEAK AREA

GC/MS ANALYST:	M. WICKHAM	ANALYSIS DATE: 6-11-87	Entry REVIEWED:		DATE: 9/8/87
DATA ANALYST:	T. GRACE	ANALYSIS DATE: 6-15-87	REVIEWED:	Mike Molloy	DATE: 9/3/87
DATA ENTRY:	M. WHITACRE	ENTRY DATE: 6-15-87	REVIEWED:		DATE:

DFT11039

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691E30X2

MRI SAMPLE NO: 11036-11039

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2678	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	444140			NA
1694	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	135378	1.39		110.9
1784	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	64387	0.94		75.2
2334	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	43582	1.01		81.0
2947	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	185488	8.69		86.9
2203	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	14619510	122.73		245.5
2592	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	993164	8.75		17.5
3183	13C-OCDF	454/456 (87/100)	454+456	1.972	242916	6.64		13.3
1759	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	1004060	11.54		24.6
2705	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	410212	5.38		10.8
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	16571434		65.343	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	6653685		60.891	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	2087731		18.460	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	641452		8.810	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	57518		1.748	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	1153386		10.292	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	714151		8.374	
NA	TOTAL-HEXA-CDD	390/392 (100/92)	390+392	4.160	623233		8.078	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	485815		12.068	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	254982		8.326	

GC/MS ANALYST: K. THORNBURG ANALYSIS DATE: 5-30-87

DATA ANALYST: T. GRACE ANALYSIS DATE: 6-15-87

DATA ENTRY: M.WHITACRE ENTRY DATE: 6-17-87

Entry REVIEWED: DATE: 9/4/87

REVIEWED: DATE: 9/8/87

REVIEWED:________________ DATE:________

DFT11040

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691F04X4

MRI SAMPLE NO: 11040 CONDENSATE

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	50.0 NG
13C-OCDF	50.0 NG
13C-1,2,3,4-TCDD	47.0 NG
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2679	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	423420			NA
1692	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	104943	1.13		90.2
1791	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	72580	1.11		88.9
2334	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	48947	1.19		95.4
2949	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.491	205696	10.10		101.0
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	ND	0.00		0.0
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	ND	0.00		0.0
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		0.0
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	ND	0.00		0.0
2708	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	8129	0.10		0.2
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	46141		0.235	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	22464		0.183	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	2774	ND<	0.022	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	1515	ND<	0.019	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.147	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	5789	ND<	0.046	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	4549	ND<	0.047	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	1665	ND<	0.019	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	2513	ND<	0.056	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	1628		0.048	

GC/MS ANALYST: R. ROBSON ANALYSIS DATE: 6-4-87 REVIEWED: P. Perkins DATE: 9/14/89
DATA ANALYST: T. GRACE ANALYSIS DATE: 6-11-87 REVIEWED: Mike Kelly DATE: 9/2/87
DATA ENTRY: M.WHITACRE ENTRY DATE: 6-17-87 REVIEWED:________________ DATE:________

DFT11049

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691EZ7X8

MRI SAMPLE NO: 11045-11049 BLK TRAIN

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	50.0 NG
13C-1,2,3,7,8-HxCDF	NA
13C-OCDF	NA
13C-1,2,3,4-TCDD	NA
13C-1,2,3,7,8,9-HxCDD	50.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (5/26/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2680	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	447612			NA
1700	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.198	97860	0.99		79.6
1790	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.543	62998	0.91		73.0
2337	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.969	50498	1.16		93.1
2950	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.481	166573	7.74		77.4
2208	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.417	38771	0.28		0.6
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.121	ND	0.00		ERR
NA	13C-OCDF	454/456 (87/100)	454+456	1.972	ND	0.00		ERR
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.689	ND	0.00		ERR
2709	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.110	8714	0.13		0.3
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.342	66051		0.360	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.134	22036		0.174	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.097	3059		0.030	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.925	3070		0.047	
NA	OCTA-CDF	442/444 (87/100)	442+444	1.774	5374	ND<	0.182	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.176	11579	ND<	0.106	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.446	6598	ND<	0.067	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	4.160	5025	ND<	0.073	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.170	8999		0.249	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.651	11253		0.409	

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 05/27/87 ENTRIES REVIEWED: BS DATE: 8/10/87

DATA ANALYST: TIM GRACE ANALYSIS DATE: 06/01/87 REVIEWED: Mike Kelly DATE: 7/8/87

DATA ENTRY: PJ BOONE ENTRY DATE: 06/02/87 REVIEWED:________ DATE:________

DFTGLW81

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07
GC/MS DATA FILE: 8691607X7
MRI SAMPLE NO: GLASS WOOL
BATCH #1

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	4395.0 NG
13C-1,2,3,7,8-HxCDF	4010.0 NG
13C-OCDF	4010.0 NG
13C-1,2,3,4-TCDD	3769.0 NG
13C-1,2,3,7,8,9-HxCDD	4010.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (7/7/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
1685	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	728808			NA
1032	13C-2,3,7,8-TCDF	316/318 (76/100)	316	4.320	356744	1.13		90.6
1064	13C-2,3,7,8-TCDD	332/334 (76/100)	332	3.896	258952	0.91		73.0
1338	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.530	133923	1.20		96.1
2009	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.490	436888	12.22		122.2
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.086	ND	0.00		0.0
1591	13C-1,2,3,4,7,8-HxCDF	336/388 (100/82)	386+388	6.485	1870080	6.60		0.2
2278	13C-OCDF	454/456 (87/100)	454+456	2.592	845364	7.47		0.2
1055	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.314	1791418	6.58		0.2
1720	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	5.135	1385936	6.18		0.2
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.488	16396064		23.090	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.014	8409104		26.043	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.373	2325146		8.351	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	4.714	494797		2.403	
NA	OCTA-CDF	442/444 (87/100)	442+444	2.372	72573		0.700	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.359	363221		0.743	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.756	463653		1.570	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	5.565	179620		0.739	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.373	478898		4.619	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.932	385390		4.567	

GC/MS ANALYST: D. MILLS   ANALYSIS DATE: 7/7/87   Entry   REVIEWED: ______ DATE: 8/13/87
DATA ANALYST: M. MOLLOY   ANALYSIS DATE: 7/8/87   REVIEWED: J Coats DATE: 8/24/87
DATA ENTRY: P. PERKINS   ENTRY DATE: 7/9/87   REVIEWED: ______ DATE: ______

DFTGLWB2

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691607X8

MRI SAMPLE NO: GLASS WOOL
BATCH #2

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	4395.0 NG
13C-1,2,3,7,8-HxCDF	4010.0 NG
13C-OCDF	4010.0 NG
13C-1,2,3,4-TCDD	3769.0 NG
13C-1,2,3,7,8,9-HxCDD	4010.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (7/7/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
1689	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	818768			NA
1034	13C-2,3,7,8-TCDF	316/318 (76/100)	316	4.320	358132	1.01		81.0
1066	13C-2,3,7,8-TCDD	332/334 (76/100)	332	3.896	265976	0.83		66.7
1339	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.530	161578	1.29		103.2
2012	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.490	558688	13.91		139.1
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.086	ND	0.00		0.0
1593	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.485	5926450	16.36		0.4
2279	13C-OCDF	454/456 (87/100)	454+456	2.592	2673820	18.47		0.5
1057	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.314	5400440	19.32		0.5
1722	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	5.135	4346930	15.15		0.4
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.488	46903393		65.797	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.014	15309057		39.297	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.373	6266869		17.601	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	4.714	2140468		8.128	
NA	OCTA-CDF	442/444 (87/100)	442+444	2.372	397680		3.000	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.359	3083448		6.142	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.756	2776834		7.794	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	5.565	1907297		6.135	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.373	3435836		25.917	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.932	10620660		98.410	

GC/MS ANALYST: D. MILLS ANALYSIS DATE: 7/7/87
DATA ANALYST: M. MOLLOY ANALYSIS DATE: 7/8/87
DATA ENTRY: P. PERKINS ENTRY DATE: 7/9/87

Entry REVIEWED: ______ DATE: 8/13/87
REVIEWED: ______ DATE: 8/12/87
REVIEWED: ______ DATE: ______

OFTFI81X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691G07X1

MRI SAMPLE NO: FILTER BATCH #1

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	4395.0 NG
13C-1,2,3,7,8-HxCDF	4010.0 NG
13C-OCDF	4010.0 NG
13C-1,2,3,4-TCDD	3769.0 NG
13C-1,2,3,7,8,9-HxCDD	4010.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (7/7/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
1704	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	496366			NA
1049	13C-2,3,7,8-TCDF	316/318 (76/100)	316	4.320	200808	0.94		74.9
1081	13C-2,3,7,8-TCDD	332/334 (76/100)	332	3.896	160896	0.83		66.6
1356	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.530	88167	1.16		92.9
2024	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.490	266213	10.94		109.4
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.086	ND	0.00		0.0
1610	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.485	10309170	59.72		1.5
2290	13C-OCDF	454/456 (87/100)	454+456	2.592	3954740	57.32		1.4
1072	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.314	9672240	57.19		1.5
1737	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	5.135	7498370	54.85		1.4
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.488	58170478		145.534	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.014	22305277		104.929	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.373	8831351		52.053	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	4.714	2570258		20.482	
NA	OCTA-CDF	442/444 (87/100)	442+444	2.372	445111		7.048	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.359	3771710		12.420	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.756	4214556		21.680	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	5.565	2914030		19.670	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.373	4113690		65.120	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.932	10780850		209.642	

GC/MS ANALYST:	R. ROBSON	ANALYSIS DATE:	7/7/87	Entry REVIEWED:	DATE: 8/13/87
DATA ANALYST:	M. MOLLOY	ANALYSIS DATE:	7/8/87	REVIEWED:	DATE: 8/22/87
DATA ENTRY:	P. PERKINS	ENTRY DATE:	7/9/87	REVIEWED:	DATE:

DFTFI810

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691607X4

MRI SAMPLE NO: FILTER BATCH #1
(DIL 1-2)

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	4395.0 NG
13C-1,2,3,7,8-HxCDF	4010.0 NG
13C-OCDF	4010.0 NG
13C-1,2,3,4-TCDD	3769.0 NG
13C-1,2,3,7,8,9-HxCDD	4010.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (7/7/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
1697	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	321964			NA
1042	13C-2,3,7,8-TCDF	316/318 (76/100)	316	4.320	126786	0.91		72.9
1074	13C-2,3,7,8-TCDD	332/334 (76/100)	332	3.896	116928	0.93		74.6
1349	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.530	52206	1.06		84.8
2017	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.490	175846	11.14		111.4
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.086	ND	0.00		0.0
1602	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.485	6478390	56.81		1.4
2283	13C-OCDF	454/456 (87/100)	454+456	2.592	2835430	62.22		1.6
1066	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.314	6480650	52.72		1.4
1730	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	5.135	4563270	50.54		1.3
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.488	NA		NA	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.014	NA		NA	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.373	NA		NA	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	4.714	NA		NA	
NA	OCTA-CDF	442/444 (87/100)	442+444	2.372	NA		NA	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.359	NA		NA	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2. 56	NA		NA	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	5.565	NA		NA	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.373	NA		NA	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.932	NA		NA	

GC/MS ANALYST: D. MILLS   ANALYSIS DATE: 7/7/87   Entry REVIEWED: [illegible]   DATE: [illegible]

DATA ANALYST: P. PERKINS   ANALYSIS DATE: 7/10/87   REVIEWED: Mike [illegible]   DATE: 8/10/87

DATA ENTRY: P. PERKINS   ENTRY DATE: 7/10/87   REVIEWED: ____________   DATE: ________

DFTFIB2X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691G07X2

MRI SAMPLE NO: FILTER BATCH #2

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	4395.0 NG
13C-1,2,3,7,8-HxCDF	4010.0 NG
13C-OCDF	4010.0 NG
13C-1,2,3,4-TCDD	3769.0 NG
13C-1,2,3,7,8,9-HxCDD	4010.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (7/7/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
1713	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	673520			NA
1054	13C-2,3,7,8-TCDF	316/318 (76/100)	316	4.320	230696	0.79		63.4
1088	13C-2,3,7,8-TCDD	332/334 (76/100)	332	3.896	95504	0.36		29.1
1364	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.530	98872	0.96		76.8
2031	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.490	374117	11.33		113.3
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.086	ND	0.00		0.0
1619	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.485	23392500	96.43		2.4
2296	13C-OCDF	454/456 (87/100)	454+456	2.592	11351590	117.08		2.9
1078	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.314	18625210	185.52		4.9
1746	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	5.135	15434320	80.34		2.0
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.488	156989682		341.881	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.014	74513203		312.575	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.373	24318858		101.995	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	4.714	5173814		29.338	
NA	OCTA-CDF	442/444 (87/100)	442+444	2.372	813274		9.163	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.359	5165211		28.655	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.756	5991152		27.482	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	5.565	5251986		25.226	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.373	5376310		60.561	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.932	4432210		61.329	

GC/MS ANALYST: R. ROBSON ANALYSIS DATE: 7/7/87

DATA ANALYST: M. MOLLOY ANALYSIS DATE: 7/8/87

DATA ENTRY: P. PERKINS ENTRY DATE: 7/9/87

Entry REVIEWED: _______ DATE: 7/13/87

REVIEWED: J White DATE: 8/22/87

REVIEWED: _______ DATE: _______

DFTFI82D

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691607XS

MRI SAMPLE NO: FILTER BATCH #2
(OIL 1-50)

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	4395.0 NG
13C-1,2,3,7,8-HxCDF	4010.0 NG
13C-OCDF	4010.0 NG
13C-1,2,3,4-TCDD	3769.0 NG
13C-1,2,3,7,8,9-HxCDD	4010.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (7/7/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
1696	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	16627			NA
1043	13C-2,3,7,8-TCDF	316/318 (76/100)	316	4.320	5999	0.84		66.8
1077	13C-2,3,7,8-TCDD	332/334 (76/100)	332	3.896	7488	1.16		92.5
1366	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.530	ND	NA		NA
2019	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.490	9529	11.69		116.9
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.086	ND	NA		NA
1602	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.485	377460	61.09		1.5
2286	13C-OCDF	454/456 (87/100)	454+456	2.592	173320	70.19		1.8
1067	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.314	477340	60.64		1.6
1730	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	5.135	252764	51.66		1.3
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.488	NA		NA	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.014	NA		NA	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.373	NA		NA	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	4.714	NA		NA	
NA	OCTA-CDF	442/444 (87/100)	442+444	2.372	NA		NA	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.359	NA		NA	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.756	NA		NA	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	5.565	NA		NA	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.373	NA		NA	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.932	NA		NA	

GC/MS ANALYST:	R. ROBSON	ANALYSIS DATE:	7/7/87	Entry REVIEWED:		DATE:	8/13/87
DATA ANALYST:	P. PERKINS	ANALYSIS DATE:	7/10/87	REVIEWED:	Mike Molly	DATE:	8/20/97
DATA ENTRY:	P. PERKINS	ENTRY DATE:	7/10/87	REVIEWED:		DATE:	

DFTFI83X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF) .

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691G07X3

MRI SAMPLE NO: FILTER BATCH #3

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	4395.0 NG
13C-1,2,3,7,8-HxCDF	4010.0 NG
13C-OCDF	4010.0 NG
13C-1,2,3,4-TCDD	3769.0 NG
13C-1,2,3,7,8,9-HxCDD	4010.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (7/7/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
1704	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	572012			NA
1048	13C-2,3,7,8-TCDF	316/318 (76/100)	316	4.320	223104	0.90		72.2
1080	13C-2,3,7,8-TCDD	332/334 (76/100)	332	3.896	129072	0.58		46.3
1357	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.530	88605	1.01		81.0
2024	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.490	303246	10.81		108.1
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.086	ND	0.00		0.0
1610	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.485	18406510	93.60		2.3
2290	13C-OCDF	454/456 (87/100)	454+456	2.592	8138560	103.56		2.6
1072	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.314	15639650	115.27		3.1
1738	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	5.135	12523350	80.42		2.0
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.488	59571604		134.145	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.014	26829948		125.590	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.373	10539230		54.533	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	4.714	3015765		21.097	
NA	OCTA-CDF	442/444 (87/100)	442+444	2.372	469087		6.520	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.359	3698535		15.182	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.756	4354904		22.291	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	5.565	2282712		13.527	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.373	2849748		39.603	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.932	2646610		45.180	

GC/MS ANALYST: R. ROBSON ANALYSIS DATE: 7/7/87 Entry REVIEWED: L. Perkins DATE: 8/13/87

DATA ANALYST: M. MOLLOY ANALYSIS DATE: 7/8/87 REVIEWED: J Yates DATE: 8/22/87

DATA ENTRY: P. PERKINS ENTRY DATE: 7/9/87 REVIEWED: ______ DATE: ______

DFTFI83D

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L07

GC/MS DATA FILE: 8691607X6

MRI SAMPLE NO: FILTER BATCH #3 (DIL 1-10)

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	10.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,4,6,7,8-HPCDD	10.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	4395.0 NG
13C-1,2,3,7,8-HxCDF	4010.0 NG
13C-OCDF	4010.0 NG
13C-1,2,3,4-TCDD	3769.0 NG
13C-1,2,3,7,8,9-HxCDD	4010.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (7/7/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
1707	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	54478			NA
1051	13C-2,3,7,8-TCDF	316/318 (76/100)	316	4.320	30480	1.30		103.6
1083	13C-2,3,7,8-TCDD	332/334 (76/100)	332	3.896	27945	1.32		105.3
1359	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.530	16596	1.99		159.3
2026	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.490	29314	10.97		109.7
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.086	ND	0.00		0.0
1612	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.465	1620808	85.27		2.1
2292	13C-OCDF	454/456 (87/100)	454+456	2.592	721750	95.01		2.4
1074	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.314	1923982	65.50		1.7
1740	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	5.135	1139980	75.73		1.9
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.488	NA		NA	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	3.014	NA		NA	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	6.373	NA		NA	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	4.714	NA		NA	
NA	OCTA-CDF	442/444 (87/100)	442+444	2.372	NA		NA	
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.359	NA		NA	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.756	NA		NA	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	5.565	NA		NA	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	2.373	NA		NA	
NA	OCTA-CDD	458/460 (87/100)	458+460	1.932	NA		NA	

GC/MS ANALYST: R. ROBSON ANALYSIS DATE: 7/7/87

DATA ANALYST: P. PERKINS ANALYSIS DATE: 7/10/87

DATA ENTRY: P. PERKINS ENTRY DATE: 7/10/87

Entry REVIEWED: DATE: [illegible]

REVIEWED: Mike [illegible] DATE: 8/20/87

REVIEWED: DATE:

SECTION 6

Ash Study

DFT1001X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF ASH EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L09
GC/MS DATA FILE: 8691H24I11
SAMPLE ID: 1001 (DCM)

RECOVERY INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	2.50 NG
13C-1,2,3,4,6,7,8-HpCDF	10.0 NG

METHOD INTERNAL STANDARDS (ASH)

13C-1,2,3,4-TCDD	1.18 NG
13C-1,2,3,4,7,8-HxCDF	5.00 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG
13C-OCDF	12.5 NG
13C-OCDD	12.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,6,7,8-HxCDD	5.00 NG
13C-1,2,3,4,6,7,8-HpCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/21/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)	
1945	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	352	1.000	2164670	NA	2.50	NA	
2723	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420	1.000	8793590	NA	10.0	NA	
2419	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	1.313	703842	0.61		12.2	
3047	13C-OCDF	454/456 (87/100)	456	0.880	615518	0.79		6.4	***
1497	13C-1,2,3,4-TCDD	332/334 (76/100)	332	0.749	232648	0.36		30.5	
2519	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402	0.954	2602090	3.10		62.0	
3041	13C-OCDD	470/472 (87/100)	472	0.694	487872	0.80		6.4	
1442	13C-2,3,7,8-TCDF	316/318 (76/100)	316	1.033	1040190	1.16		93.0	
1521	13C-2,3,7,8-TCDD	332/334 (76/100)	332	0.959	807008	0.97		77.8	
2115	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.633	574211	1.05		83.8	
2519	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	0.853	2602090	3.47		69.4	
2812	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.576	2086630	4.12		82.4	
NA	TOTAL-TETRA-CDF	304/306 (76/100)	304+306	3.190	159560763		253		
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	2.450	117629291		243		
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	1.902	82762222		309		
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	1.779	43126686		172		
3048	OCTA-CDF	442/444 (87/100)	442+444	1.733	3564220		41.8		
NA	TOTAL-TETRA-CDD	320/322 (76/100)	320+322	2.578	48252157		94.5		
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.244	44480866		100		
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	2.248	47754438		40.8		
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	1.434	27730590		37.1		
3042	OCTA-CDD	458/460 (87/100)	458+460	1.609	14201200		226		

*** = THEORETICAL CALCULATION

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 8/24/87 REVIEWED: J Gates DATE: 1/26/89
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 8/26/87 REVIEWED: ____ DATE: ____
DATA ENTRY: MIKE MOLLOY/MBS ENTRY DATE: 8/26/87,1/24/89 REVIEWED: ____ DATE: ____

DFT1002X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF ASH EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))\$(AMT.(IS)/RF)

PROJECT NO: 8691L09
GC/MS DATA FILE: 8691H26X12
SAMPLE ID: 1002 (DCM)

RECOVERY INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	2.50 NG
13C-1,2,3,4,6,7,8-HpCDF	10.0 NG

METHOD INTERNAL STANDARDS (ASH)

13C-1,2,3,4-TCDD	1.18 NG
13C-1,2,3,4,7,8-HxCDF	5.00 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG
13C-OCDF	12.5 NG
13C-OCDD	12.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,6,7,8-HxCDD	5.00 NG
13C-1,2,3,4,6,7,8-HpCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))\$AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)\$100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/21/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)	
1931	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	352	1.000	2632250	NA	2.50	NA	
2699	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420	1.000	9306300	NA	10.0	NA	
2398	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	1.313	1960440	1.60		32.1	
3019	13C-OCDF	454/456 (87/100)	456	0.880	1985921	2.42		19.4	\$\$\$
1484	13C-1,2,3,4-TCDD	332/334 (76/100)	332	0.749	513307	0.65		55.4	
2526	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402	0.954	665216	0.75		15.0	
3013	13C-OCDD	470/472 (87/100)	472	0.694	1690680	2.62		20.9	
1430	13C-2,3,7,8-TCDF	316/318 (76/100)	316	1.033	1343910	1.24		98.9	
1506	13C-2,3,7,8-TCDD	332/334 (76/100)	332	0.959	1041950	1.03		82.6	
2096	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.633	790857	1.19		94.9	
2496	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	0.853	3414040	4.30		86.0	
2787	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.576	2958170	5.52		110.4	
NA	TOTAL-TETRA-CDF	304/306 (76/100)	304+306	3.190	302846952		217		
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	2.450	281247015		263		
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	1.902	209388842		281		
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	1.779	86010790		123		
3020	OCTA-CDF	442/444 (87/100)	442+444	1.733	14647540		53.2		
NA	TOTAL-TETRA-CDD	320/322 (76/100)	320+322	2.578	95744022		85.0		
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.244	115817068		118		
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	2.248	132936608		444		
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	1.434	84624100		443		
3014	OCTA-CDD	458/460 (87/100)	458+460	1.609	56300000		259		

\$\$\$ = THEORETICAL CALCULATION

GC/MS ANALYST:	DAVE MILLS	ANALYSIS DATE:	8/26/87	REVIEWED:	J Coates	DATE:	2/3/89
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	8/28/87	REVIEWED:		DATE:	
DATA ENTRY:	MIKE MOLLOY/MBS	ENTRY DATE:	8/28/87,1/30/89	REVIEWED:		DATE:	

DFT1003X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF ASH EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L09
GC/MS DATA FILE: 8691H25X7
SAMPLE ID: 1003 (BENZENE)

RECOVERY INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	2.50 NG
13C-1,2,3,4,6,7,8-HpCDF	10.0 NG

METHOD INTERNAL STANDARDS (ASH)

13C-1,2,3,4-TCDD	1.18 NG
13C-1,2,3,4,7,8-HxCDF	5.00 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG
13C-OCDF	12.5 NG
13C-OCDD	12.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,6,7,8-HxCDD	5.00 NG
13C-1,2,3,4,6,7,8-HpCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/21/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)	
1965	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	352	1.000	2253560	NA	2.50	NA	
2739	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420	1.000	8606910	NA	10.0	NA	
2438	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	1.313	3872860	3.43		68.6	
3062	13C-OCDF	454/456 (87/100)	456	0.880	6392427	8.44		67.5	***
1510	13C-1,2,3,4-TCDD	332/334 (76/100)	332	0.749	592030	0.88		74.6	
2565	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402	0.954	2864840	3.49		69.8	
3056	13C-OCDD	470/472 (87/100)	472	0.694	5616830	9.40		75.2	
1455	13C-2,3,7,8-TCDF	316/318 (76/100)	316	1.033	998488	1.07		85.8	
1533	13C-2,3,7,8-TCDD	332/334 (76/100)	332	0.959	677040	0.78		62.7	
2133	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.633	507400	0.89		71.1	
2536	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	0.853	2420280	3.30		65.9	
2827	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.576	2052280	4.14		82.8	
NA	TOTAL-TETRA-CDF	304/306 (76/100)	304+306	3.190	338648140		211		
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	2.450	257339476		208		
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	1.902	216929760		147		
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	1.779	105865900		76.8		
3063	OCTA-CDF	442/444 (87/100)	442+444	1.733	18868250		21.3		
NA	TOTAL-TETRA-CDD	320/322 (76/100)	320+322	2.578	110902266		85.4		
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.244	115605314		102		
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	2.248	148123466		115		
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	1.434	104781100		127		
3057	OCTA-CDD	458/460 (87/100)	458+460	1.609	64489400		89.2		

*** = THEORETICAL CALCULATION

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 8/25/87 REVIEWED: J Coats DATE: 2/3/89

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 8/26/87 REVIEWED: ______ DATE: ______

DATA ENTRY: MIKE MOLLOY/MBS ENTRY DATE: 8/26/87,1/27/89 REVIEWED: ______ DATE: ______

DFT1004X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF ASH EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L09
GC/MS DATA FILE: 8691H27X4
SAMPLE ID: 1004 (BENZENE)

RECOVERY INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	2.50 NG
13C-1,2,3,4,6,7,8-HpCDF	10.0 NG

METHOD INTERNAL STANDARDS (ASH)

13C-1,2,3,4-TCDD	1.18 NG
13C-1,2,3,4,7,8-HxCDF	5.00 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG
13C-OCDF	12.5 NG
13C-OCDD	12.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,6,7,8-HxCDD	5.00 NG
13C-1,2,3,4,6,7,8-HpCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/21/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)	
1896	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	352	1.000	2299450	NA	2.50	NA	
2686	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420	1.000	8485180	NA	10.0	NA	
2379	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	1.313	5229310	4.69		93.9	
3010	13C-OCDF	454/456 (87/100)	456	0.880	7549421	10.10		80.8	***
1454	13C-1,2,3,4-TCDD	332/334 (76/100)	332	0.749	870274	1.26		107.5	
2509	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402	0.954	3395550	4.19		83.9	
3004	13C-OCDD	470/472 (87/100)	472	0.694	6626230	11.25		90.0	
1398	13C-2,3,7,8-TCDF	316/318 (76/100)	316	1.033	1331990	1.40		112.2	
1476	13C-2,3,7,8-TCDD	332/334 (76/100)	332	0.959	1022510	1.16		92.8	
2070	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.633	601296	1.03		82.6	
2480	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	0.853	3119420	4.31		86.2	
2774	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.576	2631320	5.39		107.7	
NA	TOTAL-TETRA-CDF	304/306 (76/100)	304+306	3.190	467110676		198		
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	2.450	338908115		187		
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	1.902	299346196		150		
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	1.779	125924350		67.7		
3011	OCTA-CDF	442/444 (87/100)	442+444	1.733	29208600		27.9		
NA	TOTAL-TETRA-CDD	320/322 (76/100)	320+322	2.578	155848102		81.6		
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.244	172569602		104		
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	2.248	209524446		137		
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	1.434	132828200		136		
3005	OCTA-CDD	458/460 (87/100)	458+460	1.609	79679400		93.4		

*** = THEORETICAL CALCULATION

GC/MS ANALYST:	KELLY T.	ANALYSIS DATE:	8/27/87	REVIEWED: John Coates	DATE: 2/3/89
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	8/28/87	REVIEWED:	DATE:
DATA ENTRY:	MIKE MOLLOY/MBS	ENTRY DATE:	8/28/87,1/31/89	REVIEWED:	DATE:

DFT1005X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF ASH EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L09
GC/MS DATA FILE: 8691H23X1
SAMPLE ID: 1005 (TOLUENE)

RECOVERY INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	2.50 NG
13C-1,2,3,4,6,7,8-HpCDF	10.0 NG

METHOD INTERNAL STANDARDS (ASH)

13C-1,2,3,4-TCDD	1.18 NG
13C-1,2,3,4,7,8-HxCDF	5.00 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG
13C-OCDF	12.5 NG
13C-OCDD	12.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25
13C-2,3,7,8-TCDD	1.25
13C-1,2,3,7,8-PeCDD	1.25
13C-1,2,3,6,7,8-HxCDD	5.00
13C-1,2,3,4,6,7,8-HpCDD	5.00

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/21/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)	
1941	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	352	1.000	1432120	NA	2.50	NA	
2720	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420	1.000	5965050	NA	10.0	NA	
2416	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	1.313	2881910	3.68		73.6	
3042	13C-OCDF	454/456 (87/100)	456	0.880	4587871	8.74		69.9	***
1495	13C-1,2,3,4-TCDD	332/334 (76/100)	332	0.749	317364	0.74		63.0	
2545	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402	0.954	2134090	3.75		75.0	
3037	13C-OCDD	470/472 (87/100)	472	0.694	4425110	10.69		85.5	
1439	13C-2,3,7,8-TCDF	316/318 (76/100)	316	1.033	481468	0.81		65.1	
1516	13C-2,3,7,8-TCDD	332/334 (76/100)	332	0.959	417256	0.76		60.8	
2112	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.633	397451	1.10		87.6	
2515	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	0.853	1737880	3.42		68.3	
2808	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.576	1519690	4.42		88.5	
NA	TOTAL-TETRA-CDF	304/306 (76/100)	304+306	3.190	178889160		208		
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	2.450	251243475		380		
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	1.902	209262968		191		
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	1.779	106167740		104		
3043	OCTA-CDF	442/444 (87/100)	442+444	1.733	18480880		29.1		
NA	TOTAL-TETRA-CDD	320/322 (76/100)	320+322	2.578	83741744		120		
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.244	122750886		203		
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	2.248	172168940		179		
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	1.434	120780800		197		
3038	OCTA-CDD	458/460 (87/100)	458+460	1.609	68735900		121		

*** = THEORETICAL CALCULATION

GC/MS ANALYST: KELLY T. ANALYSIS DATE: 8/23/87 REVIEWED: J Oates DATE: 9/28/87

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 8/25/87 REVIEWED: DATE: 2/3/89

DATA ENTRY: JIM DISINGER/MM ENTRY DATE: 8/25,9/21/87 REVIEWED:________ DATE:________

DFT1006X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF ASH EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L09
GC/MS DATA FILE: 8691H28X7
SAMPLE ID: 1006 (TOLUENE)

RECOVERY INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	2.50 NG
13C-1,2,3,4,6,7,8-HpCDF	10.0 NG

METHOD INTERNAL STANDARDS (ASH)

13C-1,2,3,4-TCDD	1.18 NG
13C-1,2,3,4,7,8-HxCDF	5.00 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG
13C-OCDF	12.5 NG
13C-OCDD	12.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25
13C-2,3,7,8-TCDD	1.25
13C-1,2,3,7,8-PeCDD	1.25
13C-1,2,3,6,7,8-HxCDD	5.00
13C-1,2,3,4,6,7,8-HpCDD	5.00

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/21/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)	
1939	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	332	1.000	1675350	NA	2.50	NA	
2721	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420	1.000	5700090	NA	10.0	NA	
2418	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	1.313	3798590	5.08		101.5	
3043	13C-OCDF	454/456 (87/100)	456	0.880	5470729	10.90		87.2	***
1493	13C-1,2,3,4-TCDD	332/334 (76/100)	332	0.749	577376	1.15		97.9	
2546	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402	0.954	2730870	5.02		100.4	
3037	13C-OCDD	470/472 (87/100)	472	0.694	5325180	13.46		107.7	
1437	13C-2,3,7,8-TCDF	316/318 (76/100)	316	1.033	900976	1.30		104.1	
1515	13C-2,3,7,8-TCDD	332/334 (76/100)	332	0.959	630448	0.98		78.5	
2109	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.633	514680	1.21		97.0	
2517	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	0.853	2112150	4.34		86.9	
2810	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.576	1796260	5.47		109.5	
NA	TOTAL-TETRA-CDF	304/306 (76/100)	304+306	3.190	426654821		272		
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	2.450	381066540		317		
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	1.902	288721952		200		
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	1.779	117495890		86.9		
3044	OCTA-CDF	442/444 (87/100)	442+444	1.733	21468000		28.3		
NA	TOTAL-TETRA-CDD	320/322 (76/100)	320+322	2.578	149538644		118		
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.244	181763210		165		
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	2.248	218578230		178		
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	1.434	135486700		173		
3038	OCTA-CDD	458/460 (87/100)	458+460	1.609	74423900		109		

*** = THEORETICAL CALCULATION

GC/MS ANALYST: KELLY T. ANALYSIS DATE: 8/28/87 REVIEWED: DATE: 2/3/89

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 8/28/87 REVIEWED: DATE:

DATA ENTRY: MIKE MOLLOY/MBS ENTRY DATE: 8/28/87,1/31/89 REVIEWED: DATE:

DFT1011X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF ASH EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L09
GC/MS DATA FILE: 8691H23X3
SAMPLE ID: 1011 (DCM)

RECOVERY INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	2.50 NG
13C-1,2,3,4,6,7,8-HpCDF	10.0 NG

METHOD INTERNAL STANDARDS (ASH)

13C-1,2,3,4-TCDD	1.18 NG
13C-1,2,3,4,7,8-HxCDF	5.00 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG
13C-OCDF	12.5 NG
13C-OCDD	12.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25
13C-2,3,7,8-TCDD	1.25
13C-1,2,3,7,8-PeCDD	1.25
13C-1,2,3,6,7,8-HxCDD	5.00
13C-1,2,3,4,6,7,8-HpCDD	5.00

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/21/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
1940	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	352	1.000	1328810	NA	2.50	NA
2718	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420	1.000	6085400	NA	10.0	NA
2415	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	1.313	2493910	3.12		62.4
3041	13C-OCDF	454/456 (87/100)	456	0.880	3198199	5.97		47.8 ***
1493	13C-1,2,3,4-TCDD	332/334 (76/100)	332	0.749	344040	0.86		73.6
2544	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402	0.954	1545590	2.66		53.2
3035	13C-OCDD	470/472 (87/100)	472	0.694	2997150	7.10		56.8
1437	13C-2,3,7,8-TCDF	316/318 (76/100)	316	1.033	534822	0.97		77.9
1515	13C-2,3,7,8-TCDD	332/334 (76/100)	332	0.959	440286	0.86		69.1
2111	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.633	390784	1.16		92.9
2515	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	0.853	1815720	3.50		70.0
2807	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.576	1594790	4.55		91.0
NA	TOTAL-TETRA-CDF	304/306 (76/100)	304+306	3.190	144069521		154	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	2.450	150195613		209	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	1.902	112304046		118	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	1.779	75975900		85.6	
3042	OCTA-CDF	442/444 (87/100)	442+444	1.733	9370360		21.1	
NA	TOTAL-TETRA-CDD	320/322 (76/100)	320+322	2.578	49126348		65.1	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.244	68411053		104	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	2.248	93293702		134	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	1.434	66766400		151	
3036	OCTA-CDD	458/460 (87/100)	458+460	1.609	39418700		102	

*** = THEORETICAL CALULATION

GC/MS ANALYST: KELLY T. ANALYSIS DATE: 8/23/87
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 8/25/87
DATA ENTRY: MIKE MOLLOY/MBS ENTRY DATE: 8/25/87,9/24/87

REVIEWED: J Cortes DATE: 2/3/89
REVIEWED: ______ DATE: ______
REVIEWED: ______ DATE: ______

DFT1012X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF ASH EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L09
GC/MS DATA FILE: 8691H28X5
SAMPLE ID: 1012 (DCM)

RECOVERY INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	2.50 NG
13C-1,2,3,4,6,7,8-HpCDF	10.0 NG

METHOD INTERNAL STANDARDS (ASH)

13C-1,2,3,4-TCDD	1.18 NG
13C-1,2,3,4,7,8-HxCDF	5.00 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG
13C-OCDF	12.5 NG
13C-OCDD	12.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,6,7,8-HxCDD	5.00 NG
13C-1,2,3,4,6,7,8-HpCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/21/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)	
1935	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	352	1.000	1458940	NA	2.50	NA	
2719	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420	1.000	5245050	NA	10.0	NA	
2415	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	1.313	2911870	4.23		84.6	
3041	13C-OCDF	454/456 (87/100)	456	0.880	3243683	7.02		56.2	***
1489	13C-1,2,3,4-TCDD	332/334 (76/100)	332	0.749	482462	1.10		94.0	
2544	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402	0.954	1687060	3.37		67.4	
3035	13C-OCDD	470/472 (87/100)	472	0.694	3105340	8.53		68.2	
1433	13C-2,3,7,8-TCDF	316/318 (76/100)	316	1.033	827820	1.37		109.9	
1512	13C-2,3,7,8-TCDD	332/334 (76/100)	332	0.959	629194	1.12		90.0	
2106	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.633	477690	1.29		103.4	
2514	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	0.853	2027070	4.53		90.6	
2808	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.576	1642550	5.44		108.8	
NA	TOTAL-TETRA-CDF	304/306 (76/100)	304+306	3.190	180631887		138		
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	2.450	214301695		213		
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	1.902	140036436		126		
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	1.779	82296588		79.4		
3042	OCTA-CDF	442/444 (87/100)	442+444	1.733	8598710		19.1		
NA	TOTAL-TETRA-CDD	320/322 (76/100)	320+322	2.578	73084868		69.0		
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.244	87135144		94.6		
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	2.248	111891420		147		
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	1.434	72099500		149		
3036	OCTA-CDD	458/460 (87/100)	458+460	1.609	37570600		94.0		

*** = THEORETICAL CALCULATION

GC/MS ANALYST:	KELLY T.	ANALYSIS DATE:	8/28/87	REVIEWED:	DATE: 2/3/89
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	8/28/87	REVIEWED:	DATE:
DATA ENTRY:	MIKE MOLLOY/MBS	ENTRY DATE:	8/28/87,1/31/89	REVIEWED:	DATE:

DFT1013X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF ASH EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L09
GC/MS DATA FILE: 8691M24X7
SAMPLE ID: 1013 (BENZENE)

RECOVERY INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	2.50 NG
13C-1,2,3,4,6,7,8-HpCDF	10.0 NG

METHOD INTERNAL STANDARDS (ASH)

13C-1,2,3,4-TCDD	1.18 NG
13C-1,2,3,4,7,8-HxCDF	5.00 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG
13C-OCDF	12.5 NG
13C-OCDD	12.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,6,7,8-HxCDD	5.00 NG
13C-1,2,3,4,6,7,8-HpCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/21/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
1943	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	352	1.000	2285340	NA	2.50	NA
2723	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420	1.000	8824700	NA	10.0	NA
2419	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	1.313	3983670	3.44		68.8
3047	13C-OCDF	454/456 (87/100)	456	0.880	6383729	8.22		65.7 ***
1494	13C-1,2,3,4-TCDD	332/334 (76/100)	332	0.749	538776	0.79		67.0
2547	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402	0.954	2780600	3.30		66.0
3041	13C-OCDD	470/472 (87/100)	472	0.694	5834910	9.53		76.2
1438	13C-2,3,7,8-TCDF	316/318 (76/100)	316	1.033	933968	0.99		79.1
1517	13C-2,3,7,8-TCDD	332/334 (76/100)	332	0.959	689678	0.79		62.9
2112	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.633	513548	0.89		71.0
2518	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	0.853	2461530	3.27		65.4
2811	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.576	2206010	4.34		86.8
NA	TOTAL-TETRA-CDF	304/306 (76/100)	304+306	3.190	300115098		205	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	2.450	255303256		227	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	1.902	207033170		137	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	1.779	104291100		73.6	
3047	OCTA-CDF	442/444 (87/100)	442+444	1.733	19773380		22.3	
NA	TOTAL-TETRA-CDD	320/322 (76/100)	320+322	2.578	185285026		157	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.244	113755724		111	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	2.248	144786060		116	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	1.434	106489600		133	
3041	OCTA-CDD	458/460 (87/100)	458+460	1.609	65688200		87.5	

*** = THEORETICAL CALCULATION

GC/MS ANALYST:	KELLY T.	ANALYSIS DATE:	8/24/87	REVIEWED: John Coats	DATE: 2/6/89
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	8/26/87	REVIEWED:	DATE:
DATA ENTRY:	MIKE MOLLOY/MBS	ENTRY DATE:	8/26/87,1/24/89	REVIEWED:	DATE:

DFT1014X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF ASH EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L09
GC/MS DATA FILE: 8691H26X3
SAMPLE ID: 1014 (BENZENE)

RECOVERY INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	2.50 NG
13C-1,2,3,4,6,7,8-HpCDF	10.0 NG

METHOD INTERNAL STANDARDS (ASH)

13C-1,2,3,4-TCDD	1.18 NG
13C-1,2,3,4,7,8-HxCDF	5.00 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG
13C-OCDF	12.5 NG
13C-OCDD	12.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,6,7,8-HxCDD	5.00 NG
13C-1,2,3,4,6,7,8-HpCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/21/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)	
1933	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	352	1.000	2036670	NA	2.50	NA	
2704	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420	1.000	8686970	NA	10.0	NA	
2402	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	1.313	4935480	4.33		86.6	
3025	13C-OCDF	454/456 (87/100)	456	0.880	8686299	11.36		90.9	***
1486	13C-1,2,3,4-TCDD	332/334 (76/100)	332	0.749	697616	1.14		97.3	
2530	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402	0.954	3691450	4.45		89.1	
3019	13C-OCDD	470/472 (87/100)	472	0.694	8184630	13.57		108.6	
1431	13C-2,3,7,8-TCDF	316/318 (76/100)	316	1.033	1096700	1.30		104.3	
1507	13C-2,3,7,8-TCDD	332/334 (76/100)	332	0.959	879920	1.13		90.1	
2099	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.633	694304	1.35		107.7	
2501	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	0.853	3191580	4.31		86.1	
2792	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.576	2762090	5.52		110.4	
NA	TOTAL-TETRA-CDF	304/306 (76/100)	304+306	3.190	333198804		176		
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	2.450	299214332		206		
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	1.902	254247752		135		
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	1.779	113158220		64.4		
3026	OCTA-CDF	442/444 (87/100)	442+444	1.733	22810200		18.9		
NA	TOTAL-TETRA-CDD	320/322 (76/100)	320+322	2.578	119192060		77.9		
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.244	148024098		111		
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	2.248	188065868		113		
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	1.434	121652300		115		
3020	OCTA-CDD	458/460 (87/100)	458+460	1.609	73982100		70.2		

*** = THEORETICAL CALCULATION

GC/MS ANALYST:	KELLY T.	ANALYSIS DATE:	8/26/87	REVIEWED: J Oates	DATE: 2/6/89
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	8/27/87	REVIEWED:	DATE:
DATA ENTRY:	MIKE MOLLOY/MBS	ENTRY DATE:	8/27/87,1/30/89	REVIEWED:	DATE:

DFT1015X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF ASH EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L09
GC/MS DATA FILE: 8691H25X3
SAMPLE ID: 1015 (TOLUENE)

RECOVERY INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	2.50 NG
13C-1,2,3,4,6,7,8-HpCDF	10.0 NG

METHOD INTERNAL STANDARDS (ASH)

13C-1,2,3,4-TCDD	1.18 NG
13C-1,2,3,4,7,8-HxCDF	5.00 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG
13C-OCDF	12.5 NG
13C-OCDD	12.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,6,7,8-HxCDD	5.00 NG
13C-1,2,3,4,6,7,8-HpCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/21/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
1956	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	352	1.000	2184650	NA	2.50	NA
2736	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420	1.000	8352310	NA	10.0	NA
2434	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	1.313	2142010	1.95		39.1
3060	13C-OCDF	454/456 (87/100)	456	0.880	3067068	4.17		33.4 ***
1502	13C-1,2,3,4-TCDD	332/334 (76/100)	332	0.749	425136	0.65		55.3
2562	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402	0.954	1297930	1.63		32.6
3054	13C-OCDD	470/472 (87/100)	472	0.694	2524440	4.35		34.8
1446	13C-2,3,7,8-TCDF	316/318 (76/100)	316	1.033	1016300	1.13		90.1
1525	13C-2,3,7,8-TCDD	332/334 (76/100)	332	0.959	772208	0.92		73.7
2127	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.633	590000	1.07		85.3
2532	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	0.853	2878910	4.04		80.8
2824	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.576	2184410	4.54		90.8
NA	TOTAL-TETRA-CDF	304/306 (76/100)	304+306	3.190	337058050		292	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	2.450	253001406		285	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	1.902	166428352		204	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	1.779	51813948		68.0	
3060	OCTA-CDF	442/444 (87/100)	442+444	1.733	2258650		5.31	
NA	TOTAL-TETRA-CDD	320/322 (76/100)	320+322	2.578	120382978		129	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.244	114904708		142	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	2.248	96862202		166	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	1.434	38464570		103	
3054	OCTA-CDD	458/460 (87/100)	458+460	1.609	14023150		43.2	

*** = THEORETICAL CALCULATION

GC/MS ANALYST: KELLY T.	ANALYSIS DATE:	8/25/87	REVIEWED: John Coates	DATE: 2/6/89
DATA ANALYST: MIKE MOLLOY	ANALYSIS DATE:	8/26/87	REVIEWED:	DATE:
DATA ENTRY: MIKE MOLLOY/MBS	ENTRY DATE:	8/26/87,1/24/89	REVIEWED:	DATE:

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DFT1016X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF ASH EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L09
GC/MS DATA FILE: 8691H27X7
SAMPLE ID: 1016 (TOLUENE)

RECOVERY INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	2.50 NG
13C-1,2,3,4,6,7,8-HpCDF	10.0 NG

METHOD INTERNAL STANDARDS (ASH)

13C-1,2,3,4-TCDD	1.18 NG
13C-1,2,3,4,7,8-HxCDF	5.00 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG
13C-OCDF	12.5 NG
13C-OCDD	12.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,6,7,8-HxCDD	5.00 NG
13C-1,2,3,4,6,7,8-HpCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/21/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)	
1913	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	352	1.000	2063610	NA	2.50	NA	
2696	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420	1.000	8072950	NA	10.0	NA	
2390	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	1.313	5854170	5.52		110.5	
3019	13C-OCDF	454/456 (87/100)	456	0.880	9540734	13.42		107.4	***
1469	13C-1,2,3,4-TCDD	332/334 (76/100)	332	0.749	833808	1.35		114.8	
2520	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402	0.954	4080310	5.30		105.9	
3013	13C-OCDD	470/472 (87/100)	472	0.694	8690940	15.51		124.1	
1414	13C-2,3,7,8-TCDF	316/318 (76/100)	316	1.033	1424380	1.67		133.6	
1491	13C-2,3,7,8-TCDD	332/334 (76/100)	332	0.959	1094730	1.38		110.7	
2082	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.633	752032	1.44		115.1	
2490	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	0.853	3392030	4.93		98.5	
2784	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.576	3045820	6.55		131.1	
NA	TOTAL-TETRA-CDF	304/306 (76/100)	304+306	3.190	571235008		252		
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	2.450	446351139		257		
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	1.902	370925834		167		
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	1.779	147250840		70.7		
3020	OCTA-CDF	442/444 (87/100)	442+444	1.733	33614700		25.4		
NA	TOTAL-TETRA-CDD	320/322 (76/100)	320+322	2.578	198432288		108		
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.244	226192080		142		
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	2.248	313804447		171		
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	1.434	167947000		143		
3048	OCTA-CDD	458/460 (87/100)	458+460	1.609	89849700		80.3		

*** = THEORETICAL CALCULATION

GC/MS ANALYST:	DAVE MILLS	ANALYSIS DATE:	8/27/87	REVIEWED:	J Coates	DATE:	2/6/89
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	8/28/87	REVIEWED:		DATE:	
DATA ENTRY:	MIKE MOLLOY/MBS	ENTRY DATE:	8/28/87,1/31/89	REVIEWED:		DATE:	

DFT1021X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF ASH EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(ANT.(IS)/RF)

PROJECT NO: 8691L09
GC/MS DATA FILE: 8691H25X5
SAMPLE ID: 1021 (DCM)

RECOVERY INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	2.50 NG
13C-1,2,3,4,6,7,8-HpCDF	10.0 NG

METHOD INTERNAL STANDARDS (ASH)

13C-1,2,3,4-TCDD	1.18 NG
13C-1,2,3,4,7,8-HxCDF	5.00 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG
13C-OCDF	12.5 NG
13C-OCDD	12.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,6,7,8-HxCDD	5.00 NG
13C-1,2,3,4,6,7,8-HpCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*ANT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/21/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)	
1945	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	352	1.000	2486070	NA	2.50	NA	
2729	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420	1.000	10059100	NA	10.0	NA	
2425	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	1.313	4615190	3.50		69.9	
3053	13C-OCDF	454/456 (87/100)	456	0.880	8121790	9.17		73.4	***
1493	13C-1,2,3,4-TCDD	332/334 (76/100)	332	0.749	591416	0.79		67.6	
2554	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402	0.954	3345980	3.49		69.7	
3047	13C-OCDD	470/472 (87/100)	472	0.694	7396670	10.59		84.8	
1438	13C-2,3,7,8-TCDF	316/318 (76/100)	316	1.033	1115810	1.09		86.9	
1515	13C-2,3,7,8-TCDD	332/334 (76/100)	332	0.959	845162	0.89		70.9	
2116	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.633	721064	1.14		91.6	
2524	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	0.853	3141980	3.66		73.2	
2817	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.576	2802750	4.84		96.8	
NA	TOTAL-TETRA-CDF	304/306 (76/100)	304+306	3.190	432746698		269		
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	2.450	305275474		248		
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	1.902	288890103		165		
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	1.779	131753400		80.2		
3054	OCTA-CDF	442/444 (87/100)	442+444	1.733	31663900		28.1		
NA	TOTAL-TETRA-CDD	320/322 (76/100)	320+322	2.578	124017698		95.6		
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.244	163965115		145		
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	2.248	215613028		143		
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	1.434	143289200		149		
3048	OCTA-CDD	458/460 (87/100)	458+460	1.609	83977700		88.2		

*** = THEORETICAL CALCULATION

GC/MS ANALYST:	DAVE MILLS	ANALYSIS DATE:	8/25/87	REVIEWED: John Coates	DATE: 2/3/89
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	8/26/87	REVIEWED:	DATE:
DATA ENTRY:	MIKE MOLLOY	ENTRY DATE:	8/26/87	REVIEWED:	DATE:

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DFT1022X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF ASH EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L09
GC/MS DATA FILE: 8691H27X1
SAMPLE ID: 1022 (DCM)

RECOVERY INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	2.50 NG
13C-1,2,3,4,6,7,8-HpCDF	10.0 NG

METHOD INTERNAL STANDARDS (ASH)

13C-1,2,3,4-TCDD	1.18 NG
13C-1,2,3,4,7,8-HxCDF	5.00 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG
13C-OCDF	12.5 NG
13C-OCDD	12.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,6,7,8-HxCDD	5.00 NG
13C-1,2,3,4,6,7,8-HpCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/21/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
1913	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	352	1.000	1442430	NA	2.50	NA
2694	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420	1.000	5314070	NA	10.0	NA
2389	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	1.313	2732030	3.92		78.3
3018	13C-OCDF	454/456 (87/100)	456	0.880	3250740	6.95		55.6 ***
1466	13C-1,2,3,4-TCDD	332/334 (76/100)	332	0.749	428772	0.99		84.5
2518	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402	0.954	1563420	3.08		61.7
3012	13C-OCDD	470/472 (87/100)	472	0.694	2670030	7.24		57.9
1411	13C-2,3,7,8-TCDF	316/318 (76/100)	316	1.033	757496	1.27		101.7
1489	13C-2,3,7,8-TCDD	332/334 (76/100)	332	0.959	570790	1.03		82.5
2082	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.633	423965	1.16		92.8
2489	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	0.853	1951400	4.30		86.1
2783	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.576	1603750	5.24		104.8
NA	TOTAL-TETRA-CDF	304/306 (76/100)	304+306	3.190	185082969		159	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	2.450	149629412		167	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	1.902	142675002		137	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	1.779	72380126		74.4	
3019	OCTA-CDF	442/444 (87/100)	442+444	1.733	8691450		19.3	
NA	TOTAL-TETRA-CDD	320/322 (76/100)	320+322	2.578	60486816		64.3	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.244	71875899		87.8	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	2.248	93136774		132	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	1.434	63149200		141	
3013	OCTA-CDD	458/460 (87/100)	458+460	1.609	34372100		100	

*** = THEORETICAL CALCULATION

GC/MS ANALYST:	KELLY T.	ANALYSIS DATE:	8/27/87	REVIEWED:	John Coates	DATE:	2/6/89
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	8/28/87	REVIEWED:		DATE:	
DATA ENTRY:	MIKE MOLLOY/MBS	ENTRY DATE:	8/28/87,1/30/89	REVIEWED:		DATE:	

DFT1023X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF ASH EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L09
GC/MS DATA FILE: 8691H23X7
SAMPLE ID: 1023 (BENZENE)

RECOVERY INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	2.50 NG
13C-1,2,3,4,6,7,8-HpCDF	10.0 NG

METHOD INTERNAL STANDARDS (ASH)

13C-1,2,3,4-TCDD	1.18 NG
13C-1,2,3,4,7,8-HxCDF	5.00 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG
13C-OCDF	12.5 NG
13C-OCDD	12.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25
13C-2,3,7,8-TCDD	1.25
13C-1,2,3,7,8-PeCDD	1.25
13C-1,2,3,6,7,8-HxCDD	5.00
13C-1,2,3,4,6,7,8-HpCDD	5.00

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/21/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)	
1945	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	352	1.000	1523290	NA	2.50	NA	
2721	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420	1.000	6831670	NA	10.0	NA	
2418	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	1.313	3095240	3.45		69.0	
3043	13C-OCDF	454/456 (87/100)	456	0.880	4338439	7.21		57.7	***
1495	13C-1,2,3,4-TCDD	332/334 (76/100)	332	0.749	434005	0.95		80.9	
2547	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402	0.954	2183680	3.35		67.0	
3037	13C-OCDD	470/472 (87/100)	472	0.694	4340090	9.15		73.2	
1440	13C-2,3,7,8-TCDF	316/318 (76/100)	316	1.033	626839	1.00		79.7	
1518	13C-2,3,7,8-TCDD	332/334 (76/100)	332	0.959	539948	0.92		73.9	
2113	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.633	428585	1.11		88.8	
2517	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	0.853	2001630	3.43		68.7	
2809	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.576	1681350	4.27		85.5	
NA	TOTAL-TETRA-CDF	304/306 (76/100)	304+306	3.190	168945831		143		
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	2.450	156728469		173		
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	1.902	146318672		124		
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	1.779	75698660		68.7		
3044	OCTA-CDF	442/444 (87/100)	442+444	1.733	11728180		19.5		
NA	TOTAL-TETRA-CDD	320/322 (76/100)	320+322	2.578	59073098		62.0		
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.244	75699793		91.3		
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	2.248	105213172		107		
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	1.434	78914900		126		
3038	OCTA-CDD	458/460 (87/100)	458+460	1.609	48171300		86.2		

*** = THEORETICAL CALCULATION

GC/MS ANALYST:	RICK R.	ANALYSIS DATE:	8/23/87	REVIEWED: J Carter	DATE: 10/7/87
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	8/26/87	REVIEWED: J Carter	DATE: 2/3/89
DATA ENTRY:	MIKE MOLLOY/MBS	ENTRY DATE:	8/26/87,10/1/87	REVIEWED:	DATE:

DFT1023R

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF ASH EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L09
GC/MS DATA FILE: 8691H23X9
SAMPLE ID: 1023 (BENZENE) REPLICATE INJ.

RECOVERY INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	2.50 NG
13C-1,2,3,4,6,7,8-HpCDF	10.0 NG

METHOD INTERNAL STANDARDS (ASH)

13C-1,2,3,4-TCDD	1.18 NG
13C-1,2,3,4,7,8-HxCDF	5.00 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG
13C-OCDF	12.5 NG
13C-OCDD	12.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,6,7,8-HxCDD	5.00 NG
13C-1,2,3,4,6,7,8-HpCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/21/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)	
1943	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	352	1.000	2333950	NA	2.50	NA	
2721	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420	1.000	10192700	NA	10.0	NA	
2418	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	1.313	4343390	3.25		64.9	
3043	13C-OCDF	454/456 (87/100)	456	0.880	7243637	8.07		64.6	***
1496	13C-1,2,3,4-TCDD	332/334 (76/100)	332	0.749	543776	0.78		66.2	
2546	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402	0.954	3225950	3.32		66.3	
3037	13C-OCDD	470/472 (87/100)	472	0.694	6950330	9.82		78.6	
1441	13C-2,3,7,8-TCDF	316/318 (76/100)	316	1.033	925422	0.96		76.8	
1519	13C-2,3,7,8-TCDD	332/334 (76/100)	332	0.959	717152	0.80		64.1	
2113	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.633	615896	1.04		83.3	
2517	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	0.853	2885900	3.32		66.4	
2809	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.576	2602600	4.43		88.7	
NA	TOTAL-TETRA-CDF	304/306 (76/100)	304+306	3.190	196793751		133		
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	2.450	287902287		254		
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	1.902	197775348		120		
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	1.779	103805140		67.2		
3044	OCTA-CDF	442/444 (87/100)	442+444	1.733	19454630		19.4		
NA	TOTAL-TETRA-CDD	320/322 (76/100)	320+322	2.578	83428968		69.9		
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.244	111715361		108		
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	2.248	154139632		106		
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	1.434	110940200		120		
3038	OCTA-CDD	458/460 (87/100)	458+460	1.609	65546400		73.3		

*** = THEORETICAL CALCULATION

GC/MS ANALYST: RICK R.	ANALYSIS DATE:	8/23/87	REVIEWED: Coates	DATE: 10/7/87
DATA ANALYST: MIKE MOLLOY	ANALYSIS DATE:	8/26/87	REVIEWED: Coates	DATE: 2/6/89
DATA ENTRY: MIKE MOLLOY/MBS	ENTRY DATE:	8/26/87,1/20/89	REVIEWED:	DATE:

DFT1024X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF ASH EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO:	8691L09
GC/MS DATA FILE:	8691H28X4
SAMPLE ID:	1024 (BENZENE)

RECOVERY INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	2.50 NG
13C-1,2,3,4,6,7,8-HpCDF	10.0 NG

METHOD INTERNAL STANDARDS (ASH)

13C-1,2,3,4-TCDD	1.18 NG
13C-1,2,3,4,7,8-HxCDF	5.00 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG
13C-OCDF	12.5 NG
13C-OCDD	12.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,6,7,8-HxCDD	5.00 NG
13C-1,2,3,4,6,7,8-HpCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/21/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)	
1942	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	352	1.000	1748470	NA	2.50	NA	
2721	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420	1.000	6371450	NA	10.0	NA	
2418	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	1.313	3841150	4.59		91.9	
3042	13C-OCDF	454/456 (87/100)	456	0.880	5801044	10.34		82.7	***
1495	13C-1,2,3,4-TCDD	332/334 (76/100)	332	0.749	592133	1.13		96.2	
2546	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402	0.954	2732150	4.49		89.9	
3036	13C-OCDD	470/472 (87/100)	472	0.694	5596310	12.65		101.2	
1439	13C-2,3,7,8-TCDF	316/318 (76/100)	316	1.033	896016	1.24		99.2	
1517	13C-2,3,7,8-TCDD	332/334 (76/100)	332	0.959	680288	1.01		81.2	
2111	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.633	513797	1.16		92.8	
2517	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	0.853	2141790	3.94		78.8	
2809	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.576	1829500	4.99		99.7	
NA	TOTAL-TETRA-CDF	304/306 (76/100)	304+306	3.190	267386674		166		
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	2.450	236146315		191		
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	1.902	183552908		126		
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	1.779	90747930		66.4		
3043	OCTA-CDF	442/444 (87/100)	442+444	1.733	14000370		17.4		
NA	TOTAL-TETRA-CDD	320/322 (76/100)	320+322	2.578	93595869		72.0		
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.244	108380037		95.8		
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	2.248	129995180		106		
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	1.434	94537200		121		
3037	OCTA-CDD	458/460 (87/100)	458+460	1.609	61655900		85.6		

*** = THEORETICAL CALCULATION

GC/MS ANALYST:	KELLY T.	ANALYSIS DATE:	8/28/87	REVIEWED: J Coats	DATE: 10/7/87
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	8/28/87	REVIEWED: Dale Coats	DATE: 2/6/89
DATA ENTRY:	MIKE MOLLOY/MBS	ENTRY DATE:	8/28/87,1/31/89	REVIEWED:	DATE:

DFT1025X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF ASH EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L09
GC/MS DATA FILE: 8691H24X2
SAMPLE ID: 1025 (TOLUENE)

RECOVERY INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	2.50 NG
13C-1,2,3,4,6,7,8-HpCDF	10.0 NG

METHOD INTERNAL STANDARDS (ASH)

13C-1,2,3,4-TCDD	1.18 NG
13C-1,2,3,4,7,8-HxCDF	5.00 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG
13C-OCDF	12.5 NG
13C-OCDD	12.5 NG

LAB METHOD INTERNAL STANDARDS (COLUMN)

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,6,7,8-HxCDD	5.00 NG
13C-1,2,3,4,6,7,8-HpCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/21/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
1946	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	352	1.000	2431990	NA	2.50	NA
2724	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420	1.000	9374970	NA	10.0	NA
2420	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	1.313	5657590	4.60		91.9
3048	13C-OCDF	454/456 (87/100)	456	0.880	9764269	11.83		94.6 ***
1499	13C-1,2,3,4-TCDD	332/334 (76/100)	332	0.749	780997	1.07		91.2
2549	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402	0.954	4168440	4.66		93.2
3042	13C-OCDD	470/472 (87/100)	472	0.694	8314110	12.78		102.2
1443	13C-2,3,7,8-TCDF	316/318 (76/100)	316	1.033	1233230	1.23		98.2
1521	13C-2,3,7,8-TCDD	332/334 (76/100)	332	0.959	972784	1.04		83.4
2114	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.633	746689	1.21		97.0
2519	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	0.853	3574170	4.47		89.4
2812	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.576	3034950	5.62		112.5
	TOTAL-TETRA-CDF	304/306 (76/100)	304+306	3.190			0.000	
	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	2.450			0.000	
	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	1.902			0.000	
	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	1.779			0.000	
	OCTA-CDF	442/444 (87/100)	442+444	1.733			0.000	
	TOTAL-TETRA-CDD	320/322 (76/100)	320+322	2.578			0.000	
	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.244			0.000	
	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	2.248			0.000	
	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	1.434			0.000	
	OCTA-CDD	458/460 (87/100)	458+460	1.609			0.000	

*** = THEORETICAL CALCULATION

GC/MS ANALYST: KELLY T. ANALYSIS DATE: 8/24/87 REVIEWED: J Coates DATE: 10/7/87

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 8/26/87 REVIEWED: ________ DATE: ________

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 8/26/87 REVIEWED: ________ DATE: ________

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF ASH EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO:	8691L09
GC/MS DATA FILE:	8691H26X8
SAMPLE ID:	1026 (TOLUENE)

RECOVERY INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	2.50 NG
13C-1,2,3,4,6,7,8-HpCDF	10.0 NG

METHOD INTERNAL STANDARDS (ASH)

13C-1,2,3,4-TCDD	1.18 NG
13C-1,2,3,4,7,8-HxCDF	5.00 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG
13C-OCDF	12.5 NG
13C-OCDD	12.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,6,7,8-HxCDD	5.00 NG
13C-1,2,3,4,6,7,8-HpCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/21/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)	
1929	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	352	1.000	2478650	NA	2.50	NA	
2700	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420	1.000	8744760	NA	10.0	NA	
2398	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	1.313	5393400	4.70		94.0	
3021	13C-OCDF	454/456 (87/100)	456	0.880	7846036	10.19		81.5	***
1482	13C-1,2,3,4-TCDD	332/334 (76/100)	332	0.749	752936	1.01		86.3	
2525	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402	0.954	4016870	4.81		96.3	
3015	13C-OCDD	470/472 (87/100)	472	0.694	7451770	12.28		98.2	
1428	13C-2,3,7,8-TCDF	316/318 (76/100)	316	1.033	1277310	1.25		99.8	
1504	13C-2,3,7,8-TCDD	332/334 (76/100)	332	0.959	940696	0.99		79.2	
2095	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.633	707568	1.13		90.1	
2496	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	0.853	3086430	4.14		82.8	
2787	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.576	2724650	5.41		108.2	
NA	TOTAL-TETRA-CDF	304/306 (76/100)	304+306	3.190	419104065		205		
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	2.450	361758524		230		
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	1.902	278600666		136		
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	1.779	113092280		58.9		
3021	OCTA-CDF	442/444 (87/100)	442+444	1.733	20373760		18.7		
NA	TOTAL-TETRA-CDD	320/322 (76/100)	320+322	2.578	144850097		87.7		
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.244	175502640		122		
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	2.248	203997020		113		
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	1.434	127057200		110		
3015	OCTA-CDD	458/460 (87/100)	458+460	1.609	69695400		72.7		

*** = THEORETICAL CALCULATION

GC/MS ANALYST:	DAVE MILLS	ANALYSIS DATE:	8/26/87	REVIEWED: J Coates	DATE: 2/3/89
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	8/28/87	REVIEWED:	DATE:
DATA ENTRY:	MIKE MOLLOY/MBS	ENTRY DATE:	8/28/87,1/30/89	REVIEWED:	DATE:

DFT2001X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF ASH EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L09
GC/MS DATA FILE: 8691H23X5
SAMPLE ID: 2001 (DCM)

RECOVERY INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	2.50 NG
13C-1,2,3,4,6,7,8-HpCDF	10.0 NG

METHOD INTERNAL STANDARDS (ASH)

13C-1,2,3,4-TCDD	1.18 NG
13C-1,2,3,4,7,8-HxCDF	5.00 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG
13C-OCDF	12.5 NG
13C-OCDD	12.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25
13C-2,3,7,8-TCDD	1.25
13C-1,2,3,7,8-PeCDD	1.25
13C-1,2,3,6,7,8-HxCDD	5.00
13C-1,2,3,4,6,7,8-HpCDD	5.00

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/21/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)	
1945	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	352	1.000	1657430	NA	2.50	NA	
2719	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420	1.000	6837750	NA	10.0	NA	
2417	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	1.313	326244	0.36		7.3	
3041	13C-OCDF	454/456 (87/100)	456	0.880	344225	0.57		4.6	***
1496	13C-1,2,3,4-TCDD	332/334 (76/100)	332	0.749	98752	0.20		16.9	
2546	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402	0.954	199920	0.31		6.1	
3036	13C-OCDD	470/472 (87/100)	472	0.694	309984	0.65		5.2	
1441	13C-2,3,7,8-TCDF	316/318 (76/100)	316	1.033	673272	0.98		78.7	
1520	13C-2,3,7,8-TCDD	332/334 (76/100)	332	0.959	547960	0.86		69.0	
2114	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.633	372096	0.89		70.9	
2516	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	0.853	2001650	3.43		68.6	
2807	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.576	1664790	4.23		84.6	
NA	TOTAL-TETRA-CDF	304/306 (76/100)	304+306	3.190	130930995		488		
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	2.450	105044650		510		
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	1.902	65874157		531		
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	1.779	22141360		191		
3043	OCTA-CDF	442/444 (87/100)	442+444	1.733	863160		18.1		
NA	TOTAL-TETRA-CDD	320/322 (76/100)	320+322	2.578	46754812		216		
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.244	48435702		257		
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	2.248	39698839		442		
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	1.434	15613900		272		
3036	OCTA-CDD	458/460 (87/100)	458+460	1.609	4984310		125		

*** = THEORETICAL CALCULATION

GC/MS ANALYST: RICK R. ANALYSIS DATE: 8/23/87 REVIEWED: John Coates DATE: 10/7/87

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 8/26/87 REVIEWED: J Coates DATE: 2/6/89

DATA ENTRY: MIKE MOLLOY/MBS ENTRY DATE: 8/26/87,9/28/87 REVIEWED: DATE:

DFT2002X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF ASH EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L09
GC/MS DATA FILE: 8691H28X9
SAMPLE ID: 2002 (DCM)

RECOVERY INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	2.50 NG
13C-1,2,3,4,6,7,8-HpCDF	10.0 NG

METHOD INTERNAL STANDARDS (ASH)

13C-1,2,3,4-TCDD	1.18 NG
13C-1,2,3,4,7,8-HxCDF	5.00 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG
13C-OCDF	12.5 NG
13C-OCDD	12.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,6,7,8-HxCDD	5.00 NG
13C-1,2,3,4,6,7,8-HpCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/21/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)	
1942	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	352	1.000	1431470	NA	2.50	NA	
2722	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420	1.000	4320380	NA	10.0	NA	
2418	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	1.313	256344	0.45		9.0	
3044	13C-OCDF	454/456 (87/100)	456	0.880	217102	0.57		4.6	***
1495	13C-1,2,3,4-TCDD	332/334 (76/100)	332	0.749	101861	0.24		20.2	
2549	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402	0.954	193808	0.47		9.4	
3037	13C-OCDD	470/472 (87/100)	472	0.694	200156	0.67		5.3	
1440	13C-2,3,7,8-TCDF	316/318 (76/100)	316	1.033	781504	1.32		105.7	
1518	13C-2,3,7,8-TCDD	332/334 (76/100)	332	0.959	557712	1.02		81.3	
2110	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.633	440908	1.22		97.3	
2516	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	0.853	1614840	4.38		87.6	
2811	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.576	1232550	4.95		99.1	
NA	TOTAL-TETRA-CDF	304/306 (76/100)	304+306	3.190	147439376		533		
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	2.450	87579623		412		
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	1.902	57284587		587		
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	1.779	16635288		182		
3043	OCTA-CDF	442/444 (87/100)	442+444	1.733	507512		16.9		
NA	TOTAL-TETRA-CDD	320/322 (76/100)	320+322	2.578	55904590		250		
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.244	50876137		262		
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	2.248	32394560		372		
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	1.434	10833100		195		
3037	OCTA-CDD	458/460 (87/100)	458+460	1.609	3151150		122		

*** = THEORETICAL CALCULATION

GC/MS ANALYST:	DAVE MILLS	ANALYSIS DATE:	8/28/87	REVIEWED:	DATE: 2/3/89
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	8/28/87	REVIEWED:	DATE:
DATA ENTRY:	MIKE MOLLOY/MBS	ENTRY DATE:	8/28/87,1/31/89	REVIEWED:	DATE:

DFT2003X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF ASH EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L09
GC/MS DATA FILE: 8691H24X5
SAMPLE ID: 2003 (BENZENE)

RECOVERY INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	2.50 NG
13C-1,2,3,4,6,7,8-HpCDF	10.0 NG

METHOD INTERNAL STANDARDS (ASH)

13C-1,2,3,4-TCDD	1.18 NG
13C-1,2,3,4,7,8-HxCDF	5.00 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG
13C-OCDF	12.5 NG
13C-OCDD	12.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25
13C-2,3,7,8-TCDD	1.25
13C-1,2,3,7,8-PeCDD	1.25
13C-1,2,3,6,7,8-HxCDD	5.00
13C-1,2,3,4,6,7,8-HpCDD	5.00

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/21/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)	
1945	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	352	1.000	2354490	NA	2.50	NA	
2724	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420	1.000	8766590	NA	10.0	NA	
2420	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	1.313	4736600	4.12		82.3	
3048	13C-OCDF	454/456 (87/100)	456	0.880	5240723	6.79		54.3	***
1497	13C-1,2,3,4-TCDD	332/334 (76/100)	332	0.749	701296	0.99		84.6	
2549	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402	0.954	2960410	3.54		70.8	
3042	13C-OCDD	470/472 (87/100)	472	0.694	4608700	7.57		60.6	
1442	13C-2,3,7,8-TCDF	316/318 (76/100)	316	1.033	1142900	1.17		94.0	
1520	13C-2,3,7,8-TCDD	332/334 (76/100)	332	0.959	805568	0.89		71.4	
2113	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.633	690576	1.16		92.6	
2520	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	0.853	2946070	3.94		78.8	
2813	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.576	2320570	4.60		92.0	
NA	TOTAL-TETRA-CDF	304/306 (76/100)	304+306	3.190	1051664876		552		
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	2.450	719461021		492		
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	1.902	395955064		220		
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	1.779	116885600		69.3		
3049	OCTA-CDF	442/444 (87/100)	442+444	1.733	8581360		11.8		
NA	TOTAL-TETRA-CDD	320/322 (76/100)	320+322	2.578	514937196		335		
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.244	503013110		376		
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	2.248	348565574		262		
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	1.434	129189400		152		
3043	OCTA-CDD	458/460 (87/100)	458+460	1.609	44608900		75.2		

*** = THEORETICAL CALCULATION

GC/MS ANALYST: KELLY T. ANALYSIS DATE: 8/24/87 REVIEWED: DATE: 2/3/89

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 8/26/87 REVIEWED: DATE:

DATA ENTRY: MIKE MOLLOY/MBS ENTRY DATE: 8/26/87,1/24/89 REVIEWED: DATE:

DFT2004X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF ASH EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L09
GC/MS DATA FILE: 8691H26X6
SAMPLE ID: 2004 (BENZENE)

RECOVERY INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	2.50 NG
13C-1,2,3,4,6,7,8-HpCDF	10.0 NG

METHOD INTERNAL STANDARDS (ASH)

13C-1,2,3,4-TCDD	1.18 NG
13C-1,2,3,4,7,8-HxCDF	5.00 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG
13C-OCDF	12.5 NG
13C-OCDD	12.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,6,7,8-HxCDD	5.00 NG
13C-1,2,3,4,6,7,8-HpCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/21/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)	
1908	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	352	1.000	2703930	NA	2.50	NA	
2692	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420	1.000	9731830	NA	10.0	NA	
2386	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	1.313	4807550	3.76		75.3	
3014	13C-OCDF	454/456 (87/100)	456	0.880	4890981	5.71		45.7	***
1464	13C-1,2,3,4-TCDD	332/334 (76/100)	332	0.749	712194	0.88		74.8	
2515	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402	0.954	3157960	3.40		68.0	
3008	13C-OCDD	470/472 (87/100)	472	0.694	4261430	6.31		50.5	
1408	13C-2,3,7,8-TCDF	316/318 (76/100)	316	1.033	1296940	1.16		92.9	
1485	13C-2,3,7,8-TCDD	332/334 (76/100)	332	0.959	962672	0.93		74.3	
2078	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.633	860256	1.26		100.5	
2485	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	0.853	3441910	4.15		82.9	
2780	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.576	2798170	4.99		99.9	
NA	TOTAL-TETRA-CDF	304/306 (76/100)	304+306	3.190	874597390		452		
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	2.450	723991705		488		
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	1.902	460986638		252		
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	1.779	128509470		75.1		
3015	OCTA-CDF	442/444 (87/100)	442+444	1.733	10381620		15.3		
NA	TOTAL-TETRA-CDD	320/322 (76/100)	320+322	2.578	449678850		288		
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.244	508338753		374		
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	2.248	370943700		261		
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	1.434	141444300		156		
3009	OCTA-CDD	458/460 (87/100)	458+460	1.609	54382600		99.1		

*** = THEORETICAL CALCULATION

GC/MS ANALYST:	KELLY T.	ANALYSIS DATE:	8/26/87	REVIEWED: John Wates	DATE: 10/12/87
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	8/27/87	REVIEWED: J Wates	DATE: 2/6/89
DATA ENTRY:	MIKE MOLLOY/MBS	ENTRY DATE:	8/27/87,1/30/89	REVIEWED:	DATE:

DFT2005X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF ASH EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L09
GC/MS DATA FILE: 8691H25X1
SAMPLE ID: 2005 (TOLUENE)

RECOVERY INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	2.50 NG
13C-1,2,3,4,6,7,8-HpCDF	10.0 NG

METHOD INTERNAL STANDARDS (ASH)

13C-1,2,3,4-TCDD	1.18 NG
13C-1,2,3,4,7,8-HxCDF	5.00 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG
13C-OCDF	12.5 NG
13C-OCDD	12.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,6,7,8-HxCDD	5.00 NG
13C-1,2,3,4,6,7,8-HpCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/21/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
1953	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	352	1.000	1823770	NA	2.50	NA
2736	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420	1.000	7111740	NA	10.0	NA
2433	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	1.313	3242430	3.47		69.5
3061	13C-OCDF	454/456 (87/100)	456	0.880	5624154	8.98		71.9 ###
1498	13C-1,2,3,4-TCDD	332/334 (76/100)	332	0.749	478088	0.88		74.5
2561	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402	0.954	2543900	3.75		75.0
3054	13C-OCDD	470/472 (87/100)	472	0.694	4903990	9.93		79.5
1442	13C-2,3,7,8-TCDF	316/318 (76/100)	316	1.033	733440	0.97		77.9
1520	13C-2,3,7,8-TCDD	332/334 (76/100)	332	0.959	555565	0.79		63.5
2125	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.633	521704	1.13		90.3
2532	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	0.853	2176920	3.59		71.8
2824	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.576	1786520	4.36		87.3
NA	TOTAL-TETRA-CDF	304/306 (76/100)	304+306	3.190	740725486		571	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	2.450	592423224		594	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	1.902	399251850		324	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	1.779	119257140		103	
3061	OCTA-CDF	442/444 (87/100)	442+444	1.733	11043380		14.2	
NA	TOTAL-TETRA-CDD	320/322 (76/100)	320+322	2.578	352984470		336	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.244	387167420		424	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	2.248	322408696		282	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	1.434	130614400		179	
3055	OCTA-CDD	458/460 (87/100)	458+460	1.609	55293100		87.6	

= THEORETICAL CALCULATION

GC/MS ANALYST:	KELLY T.	ANALYSIS DATE:	8/25/87	REVIEWED:	DATE: 10/12/87
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	8/26/87	REVIEWED:	DATE: 2/6/89
DATA ENTRY:	MIKE MOLLOY/MBS	ENTRY DATE:	8/26/87,1/24/89	REVIEWED:	DATE:

(31)

DFT2006X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF ASH EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L09
GC/MS DATA FILE: 8691H27X9
SAMPLE ID: 2006 (TOLUENE)

RECOVERY INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	2.50 NG
13C-1,2,3,4,6,7,8-HpCDF	10.0 NG

METHOD INTERNAL STANDARDS (ASH)

13C-1,2,3,4-TCDD	1.18 NG
13C-1,2,3,4,7,8-HxCDF	5.00 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG
13C-OCDF	12.5 NG
13C-OCDD	12.5 NG

LAB METHOD INTERNAL STANDARDS (COLUMN)

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,6,7,8-HxCDD	5.00 NG
13C-1,2,3,4,6,7,9-HpCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/21/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)	
1924	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	352	1.000	1807510	NA	2.50	NA	
2698	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420	1.000	5999290	NA	10.0	NA	
2395	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	1.313	3649590	4.63		92.7	
3021	13C-OCDF	454/456 (87/100)	456	0.880	4642123	8.79		70.3	***
1479	13C-1,2,3,4-TCDD	332/334 (76/100)	332	0.749	557416	1.03		87.6	
2494	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402	0.954	2152470	3.76		75.2	
3015	13C-OCDD	470/472 (87/100)	472	0.694	4745420	11.40		91.2	
1424	13C-2,3,7,8-TCDF	316/318 (76/100)	316	1.033	970224	1.30		103.9	
1501	13C-2,3,7,8-TCDD	332/334 (76/100)	332	0.959	698144	1.01		80.6	
2092	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.633	604616	1.32		105.6	
2494	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	0.853	2152470	4.21		84.1	
2786	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.576	1692700	4.90		98.0	
	TOTAL-TETRA-CDF	304/306 (76/100)	304+306	3.190			0.000		
	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	2.450			0.000		
	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	1.902			0.000		
	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	1.779			0.000		
	OCTA-CDF	442/444 (87/100)	442+444	1.733			0.000		
	TOTAL-TETRA-CDD	320/322 (76/100)	320+322	2.578			0.000		
	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.244			0.000		
	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	2.248			0.000		
	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	1.434			0.000		
	OCTA-CDD	458/460 (87/100)	458+460	1.609			0.000		

*** = THEORETICAL CALCULATION

GC/MS ANALYST:	DAVE MILLS	ANALYSIS DATE:	8/27/87	REVIEWED:	DATE: 10/7/87
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	8/28/87	REVIEWED:	DATE:
DATA ENTRY:	MIKE MOLLOY	ENTRY DATE:	8/28/87	REVIEWED:	DATE:

DFT2011X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF ASH EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L09
GC/MS DATA FILE: 8691H25X4
SAMPLE ID: 2011 (DCM)

RECOVERY INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	2.50 NG
13C-1,2,3,4,6,7,8-HpCDF	10.0 NG

METHOD INTERNAL STANDARDS (ASH)

13C-1,2,3,4-TCDD	1.18 NG
13C-1,2,3,4,7,8-HxCDF	5.00 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG
13C-OCDF	12.5 NG
13C-OCDD	12.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25
13C-2,3,7,8-TCDD	1.25
13C-1,2,3,7,8-PeCDD	1.25
13C-1,2,3,6,7,8-HxCDD	5.00
13C-1,2,3,4,6,7,8-HpCDD	5.00

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/21/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
1948	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	352	1.000	1795160	NA	2.50	NA
2731	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420	1.000	7832190	NA	10.0	NA
2428	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	1.313	3639230	3.54		70.8
3056	13C-OCDF	454/456 (87/100)	456	0.880	5657843	8.20		65.6 ***
1494	13C-1,2,3,4-TCDD	332/334 (76/100)	332	0.749	520128	0.97		82.3
2356	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402	0.954	2313020	3.09		61.9
3050	13C-OCDD	470/472 (87/100)	472	0.694	4742550	8.72		69.8
1439	13C-2,3,7,8-TCDF	316/318 (76/100)	316	1.033	854356	1.15		92.1
1517	13C-2,3,7,8-TCDD	332/334 (76/100)	332	0.959	612784	0.89		71.2
2119	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.633	520992	1.15		91.6
2527	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	0.853	2501640	3.74		74.9
2819	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.576	2101980	4.66		93.2
NA	TOTAL-TETRA-CDF	304/306 (76/100)	304+306	3.190	215997300		153	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	2.450	197585979		182	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	1.902	180100848		130	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	1.779	92074850		71.1	
3057	OCTA-CDF	442/444 (87/100)	442+444	1.733	13544440		17.3	
NA	TOTAL-TETRA-CDD	320/322 (76/100)	320+322	2.578	70307443		61.6	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.244	87826624		88.4	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	2.248	122185738		117	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	1.434	86950900		131	
3050	OCTA-CDD	458/460 (87/100)	458+460	1.609	52615500		86.2	

*** = THEORETICAL CALCULATION

GC/MS ANALYST:	KELLY T.	ANALYSIS DATE:	8/25/87	REVIEWED:		DATE: 2/3/89
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	8/26/87	REVIEWED:		DATE:
DATA ENTRY:	MIKE MOLLOY/MBS	ENTRY DATE:	8/26/87,1/24/89	REVIEWED:		DATE:

DFT2012X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF ASH EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L09
GC/MS DATA FILE: 8691H27X6
SAMPLE ID: 2012 (DCM)

RECOVERY INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	2.50 NG
13C-1,2,3,4,6,7,8-HpCDF	10.0 NG

METHOD INTERNAL STANDARDS (ASH)

13C-1,2,3,4-TCDD	1.18 NG
13C-1,2,3,4,7,8-HxCDF	5.00 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG
13C-OCDF	12.5 NG
13C-OCDD	12.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,6,7,8-HxCDD	5.00 NG
13C-1,2,3,4,6,7,8-HpCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/21/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)	
1911	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	352	1.000	1332860	NA	2.50	NA	
2693	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420	1.000	4414110	NA	10.0	NA	
2388	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	1.313	1391030	2.40		48.0	
3017	13C-OCDF	454/456 (87/100)	456	0.880	1328778	3.42		27.4	***
1466	13C-1,2,3,4-TCDD	332/334 (76/100)	332	0.749	340555	0.85		72.6	
2518	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402	0.954	651938	1.55		31.0	
3011	13C-OCDD	470/472 (87/100)	472	0.694	1227640	4.01		32.1	
1412	13C-2,3,7,8-TCDF	316/318 (76/100)	316	1.033	749284	1.36		108.8	
1489	13C-2,3,7,8-TCDD	332/334 (76/100)	332	0.959	476912	0.93		74.6	
2081	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.633	403880	1.20		95.7	
2488	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	0.853	1633590	4.34		86.8	
2782	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.576	1254670	4.94		98.7	
NA	TOTAL-TETRA-CDF	304/306 (76/100)	304+306	3.190	403708605		437		
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	2.450	275911248		389		
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	1.902	185091690		350		
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	1.779	54784502		111		
3018	OCTA-CDF	442/444 (87/100)	442+444	1.733	2601960		14.1		
NA	TOTAL-TETRA-CDD	320/322 (76/100)	320+322	2.578	149766624		200		
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.244	147332147		227		
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	2.248	114876655		392		
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	1.434	41868430		224		
3012	OCTA-CDD	458/460 (87/100)	458+460	1.609	15189460		96.1		

*** = THEORETICAL CALCULATION

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 8/27/87 REVIEWED: DATE: 10/12/87

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 8/28/87 REVIEWED: DATE: 2/7/89

DATA ENTRY: MIKE MOLLOY/MBS ENTRY DATE: 8/28/87,1/31/89 REVIEWED: DATE:

DFT2013X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF ASH EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L09
GC/MS DATA FILE: 8691H23X4
SAMPLE ID: 2013 (BENZENE)

RECOVERY INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	2.50 NG
13C-1,2,3,4,6,7,8-HpCDF	10.0 NG

METHOD INTERNAL STANDARDS (ASH)

13C-1,2,3,4-TCDD	1.18 NG
13C-1,2,3,4,7,8-HxCDF	5.00 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG
13C-OCDF	12.5 NG
13C-OCDD	12.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25
13C-2,3,7,8-TCDD	1.25
13C-1,2,3,7,8-PeCDD	1.25
13C-1,2,3,6,7,8-HxCDD	5.00
13C-1,2,3,4,6,7,8-HpCDD	5.00

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/21/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)	
1941	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	352	1.000	1330070	NA	2.50	NA	
2717	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420	1.000	5379190	NA	10.0	NA	
2414	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	1.313	2276890	3.22		64.5	
3040	13C-OCDF	454/456 (87/100)	456	0.880	3351566	7.08		56.6	***
1493	13C-1,2,3,4-TCDD	332/334 (76/100)	332	0.749	312848	0.79		66.8	
2543	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402	0.954	1683030	3.28		65.6	
3033	13C-OCDD	470/472 (87/100)	472	0.694	3114620	8.34		66.7	
1438	13C-2,3,7,8-TCDF	316/318 (76/100)	316	1.033	479142	0.87		69.7	
1515	13C-2,3,7,8-TCDD	332/334 (76/100)	332	0.959	423480	0.83		66.4	
2109	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.633	351876	1.04		83.5	
2513	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	0.853	1573060	3.43		68.6	
2805	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.576	1269590	4.10		82.0	
NA	TOTAL-TETRA-CDF	304/306 (76/100)	304+306	3.190	391529900		461		
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	2.450	372740987		571		
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	1.902	232616104		269		
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	1.779	83246790		103		
3040	OCTA-CDF	442/444 (87/100)	442+444	1.733	5389800		11.6		
NA	TOTAL-TETRA-CDD	320/322 (76/100)	320+322	2.578	207149497		302		
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.244	244712056		410		
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	2.248	210922318		279		
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	1.434	87667700		182		
3034	OCTA-CDD	458/460 (87/100)	458+460	1.609	33356200		83.2		

*** = THEORETICAL CALCULATION

GC/MS ANALYST: KELLY T. ANALYSIS DATE: 8/23/87

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 8/25/87

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 8/25/87

REVIEWED: J Carter DATE: 2/3/89

REVIEWED: ______ DATE: ______

REVIEWED: ______ DATE: ______

DFT2014X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF ASH EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L09
GC/MS DATA FILE: 8691H28X3
SAMPLE ID: 2014 (BENZENE)

RECOVERY INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	2.50 NG
13C-1,2,3,4,6,7,8-HpCDF	10.0 NG

METHOD INTERNAL STANDARDS (ASH)

13C-1,2,3,4-TCDD	1.18 NG
13C-1,2,3,4,7,8-HxCDF	5.00 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG
13C-OCDF	12.5 NG
13C-OCDD	12.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,6,7,8-HxCDD	5.00 NG
13C-1,2,3,4,6,7,8-HpCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/21/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)	
1934	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	352	1.000	1787660	NA	2.50	NA	
2719	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420	1.000	5846840	NA	10.0	NA	
2415	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	1.313	3758040	4.90		97.9	
3041	13C-OCDF	454/456 (87/100)	456	0.880	4214515	8.19		65.5	***
1488	13C-1,2,3,4-TCDD	332/334 (76/100)	332	0.749	577942	1.08		91.9	
2543	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402	0.954	2444470	4.38		87.6	
3035	13C-OCDD	470/472 (87/100)	472	0.694	3872120	9.54		76.3	
1432	13C-2,3,7,8-TCDF	316/318 (76/100)	316	1.033	940016	1.27		101.8	
1511	13C-2,3,7,8-TCDD	332/334 (76/100)	332	0.959	693410	1.01		80.9	
2105	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.633	546208	1.21		96.5	
2513	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	0.853	2147390	4.31		86.1	
2808	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.576	1707310	5.07		101.4	
NA	TOTAL-TETRA-CDF	304/306 (76/100)	304+306	3.190	745552805		475		
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	2.450	617445134		512		
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	1.902	347750140		243		
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	1.779	106082570		79.3		
3041	OCTA-CDF	442/444 (87/100)	442+444	1.733	7208020		12.3		
NA	TOTAL-TETRA-CDD	320/322 (76/100)	320+322	2.578	330740990		261		
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.244	364644832		330		
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	2.248	272163244		248		
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	1.434	112376800		160		
3036	OCTA-CDD	458/460 (87/100)	458+460	1.609	42577800		85.4		

*** = THEORETICAL CALCULATION

GC/MS ANALYST:	KELLY T.	ANALYSIS DATE:	8/28/87	REVIEWED:	DATE: 2/3/55
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	8/28/87	REVIEWED:	DATE:
DATA ENTRY:	MIKE MOLLOY/MBS	ENTRY DATE:	8/28/87,1/31/89	REVIEWED:	DATE:

DFT2015X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF ASH EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L09
GC/MS DATA FILE: 8691H24X9
SAMPLE ID: 2015 (TOLUENE)

RECOVERY INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	2.50 NG
13C-1,2,3,4,6,7,8-HpCDF	10.0 NG

METHOD INTERNAL STANDARDS (ASH)

13C-1,2,3,4-TCDD	1.18 NG
13C-1,2,3,4,7,8-HxCDF	5.00 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG
13C-OCDF	12.5 NG
13C-OCDD	12.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25
13C-2,3,7,8-TCDD	1.25
13C-1,2,3,7,8-PeCDD	1.25
13C-1,2,3,6,7,8-HxCDD	5.00
13C-1,2,3,4,6,7,8-HpCDD	5.00

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/21/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)	
1955	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	352	1.000	3520570	NA	2.50	NA	
2725	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420	1.000	12369100	NA	10.0	NA	
2424	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	1.313	6321850	3.89		77.9	
3047	13C-OCDF	454/456 (87/100)	456	0.880	9026162	8.29		66.3	***
1506	13C-1,2,3,4-TCDD	332/334 (76/100)	332	0.749	901552	0.85		72.8	
2551	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402	0.954	4667990	3.95		79.1	
3041	13C-OCDD	470/472 (87/100)	472	0.694	8307190	9.68		77.4	
1451	13C-2,3,7,8-TCDF	316/318 (76/100)	316	1.033	1545610	1.06		85.0	
1528	13C-2,3,7,8-TCDD	332/334 (76/100)	332	0.959	1195710	0.89		70.8	
2121	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.633	921096	1.03		82.6	
2522	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	0.853	3848920	3.65		73.0	
2812	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.576	3216060	4.52		90.3	
NA	TOTAL-TETRA-CDF	304/306 (76/100)	304+306	3.190	1413779312		578		
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	2.450	1009583756		537		
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	1.902	594992270		247		
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	1.779	168417870		74.9		
3048	OCTA-CDF	442/444 (87/100)	442+444	1.733	19342810		15.5		
NA	TOTAL-TETRA-CDD	320/322 (76/100)	320+322	2.578	636485610		322		
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.244	729496460		424		
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	2.248	543079980		259		
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	1.434	188968200		141		
3042	OCTA-CDD	458/460 (87/100)	458+460	1.609	77451100		72.4		

*** = THEORETICAL CALCULATION

GC/MS ANALYST:	DAVE MILLS	ANALYSIS DATE:	8/24/87	REVIEWED:		DATE:	10/7/87
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	8/26/87	REVIEWED:		DATE:	2/3/89
DATA ENTRY:	MIKE MOLLOY/MBS	ENTRY DATE:	8/26/87,1/24/89	REVIEWED:		DATE:	

DFT2016X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF ASH EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L09
GC/MS DATA FILE: 8691H26X1
SAMPLE ID: 2016 (TOLUENE)

RECOVERY INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	2.50 NG
13C-1,2,3,4,6,7,8-HpCDF	10.0 NG

METHOD INTERNAL STANDARDS (ASH)

13C-1,2,3,4-TCDD	1.18 NG
13C-1,2,3,4,7,8-HxCDF	5.00 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG
13C-OCDF	12.5 NG
13C-OCDD	12.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25
13C-2,3,7,8-TCDD	1.25
13C-1,2,3,7,8-PeCDD	1.25
13C-1,2,3,6,7,8-HxCDD	5.00
13C-1,2,3,4,6,7,8-HpCDD	5.00

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/21/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)	
1930	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	352	1.000	4249720	NA	2.50	NA	
2700	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420	1.000	15152100	NA	10.0	NA	
2398	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	1.313	6160350	3.10		61.9	
3016	13C-OCDF	454/456 (87/100)	456	0.880	8740344	6.55		52.4	***
1483	13C-1,2,3,4-TCDD	332/334 (76/100)	332	0.749	848418	0.67		56.7	
2525	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402	0.954	4691930	3.24		64.9	
3015	13C-OCDD	470/472 (87/100)	472	0.694	8180350	7.78		62.2	
1428	13C-2,3,7,8-TCDF	316/318 (76/100)	316	1.033	1315710	0.75		59.9	
1505	13C-2,3,7,8-TCDD	332/334 (76/100)	332	0.959	979328	0.60		48.1	
2095	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.633	873984	0.81		64.9	
2496	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	0.853	3515900	2.72		54.4	
2787	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.576	2995930	3.43		68.7	
NA	TOTAL-TETRA-CDF	304/306 (76/100)	304+306	3.190	1154310240		501		
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	2.450	923005436		522		
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	1.902	540428098		231		
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	1.779	159332610		72.7		
3022	OCTA-CDF	442/444 (87/100)	442+444	1.733	18872280		15.6		
NA	TOTAL-TETRA-CDD	320/322 (76/100)	320+322	2.578	573022380		308		
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.244	666622793		411		
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	2.248	496014920		235		
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	1.434	180632400		134		
3016	OCTA-CDD	458/460 (87/100)	458+460	1.609	81278900		77.2		

*** = THEORETICAL CALCULATION

GC/MS ANALYST:	KELLY T.	ANALYSIS DATE:	8/26/87	REVIEWED:	DATE: 2/3/89
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	8/27/87	REVIEWED:	DATE:
DATA ENTRY:	MIKE MOLLOY/MBS	ENTRY DATE:	8/27/87,1/30/89	REVIEWED:	DATE:

DFT2021X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF ASH EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L09
GC/MS DATA FILE: 8691H24X4
SAMPLE ID: 2021 (DCM)

RECOVERY INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	2.50 NG
13C-1,2,3,4,6,7,8-HpCDF	10.0 NG

METHOD INTERNAL STANDARDS (ASH)

13C-1,2,3,4-TCDD	1.18 NG
13C-1,2,3,4,7,8-HxCDF	5.00 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG
13C-OCDF	12.5 NG
13C-OCDD	12.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,6,7,8-HxCDD	5.00 NG
13C-1,2,3,4,6,7,8-HpCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/21/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
1956	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	352	1.000	1977640	NA	2.50	NA
2726	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420	1.000	7226970	NA	10.0	NA
2425	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	1.313	1617790	1.71		34.1
3049	13C-OCDF	454/456 (87/100)	456	0.880	1327091	2.09		16.7 ***
1507	13C-1,2,3,4-TCDD	332/334 (76/100)	332	0.749	463236	0.78		66.6
2553	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402	0.954	720909	1.05		20.9
3043	13C-OCDD	470/472 (87/100)	472	0.694	1101150	2.20		17.6
1452	13C-2,3,7,8-TCDF	316/318 (76/100)	316	1.033	1031670	1.26		101.0
1530	13C-2,3,7,8-TCDD	332/334 (76/100)	332	0.959	721264	0.95		76.1
2123	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.633	569088	1.14		90.9
2524	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	0.853	2401430	3.90		77.9
2814	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.576	1917150	4.61		92.1
NA	TOTAL-TETRA-CDF	304/306 (76/100)	304+306	3.190	467504969		372	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	2.450	318177742		329	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	1.902	199933090		325	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	1.779	57335580		99.6	
3050	OCTA-CDF	442/444 (87/100)	442+444	1.733	2323690		12.6	
NA	TOTAL-TETRA-CDD	320/322 (76/100)	320+322	2.578	174562868		172	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.244	162671680		184	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	2.248	132018230		407	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	1.434	44833800		217	
3044	OCTA-CDD	458/460 (87/100)	458+460	1.609	14088560		99.4	

*** = THEORETICAL CALCULATION

GC/MS ANALYST:	KELLY T.	ANALYSIS DATE:	8/24/87	REVIEWED: Jak Coats	DATE: 2/3/55
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	8/26/87	REVIEWED:	DATE:
DATA ENTRY:	MIKE MOLLOY/MBS	ENTRY DATE:	8/26/87,1/24/89	REVIEWED:	DATE:

DFT2022X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF ASH EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L09
GC/MS DATA FILE: 8691H26X5
SAMPLE ID: 2022 (DCM)

RECOVERY INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	2.50 NG
13C-1,2,3,4,6,7,8-HpCDF	10.0 NG

METHOD INTERNAL STANDARDS (ASH)

13C-1,2,3,4-TCDD	1.18 NG
13C-1,2,3,4,7,8-HxCDF	5.00 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG
13C-OCDF	12.5 NG
13C-OCDD	12.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,6,7,8-HxCDD	5.00 NG
13C-1,2,3,4,6,7,8-HpCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/21/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)	
1921	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	352	1.000	1869180	NA	2.50	NA	
2700	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420	1.000	7062390	NA	10.0	NA	
2396	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	1.313	2093110	2.26		45.2	
3022	13C-OCDF	454/456 (87/100)	456	0.880	1842100	2.96		23.7	***
1475	13C-1,2,3,4-TCDD	332/334 (76/100)	332	0.749	442172	0.79		67.2	
2525	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402	0.954	903152	1.34		26.8	
3016	13C-OCDD	470/472 (87/100)	472	0.694	1679660	3.43		27.4	
1420	13C-2,3,7,8-TCDF	316/318 (76/100)	316	1.033	943528	1.22		97.7	
1497	13C-2,3,7,8-TCDD	332/334 (76/100)	332	0.959	666624	0.93		74.4	
2090	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.633	555632	1.17		93.9	
2495	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	0.853	2498840	4.15		83.0	
2789	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.576	2058270	5.06		101.2	
NA	TOTAL-TETRA-CDF	304/306 (76/100)	304+306	3.190	364521978		304		
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	2.450	333379365		362		
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	1.902	220658980		277		
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	1.779	69825076		93.7		
3023	OCTA-CDF	442/444 (87/100)	442+444	1.733	3238470		12.7		
NA	TOTAL-TETRA-CDD	320/322 (76/100)	320+322	2.578	159793068		165		
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.244	159504090		189		
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	2.248	158678280		391		
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	1.434	58181800		225		
3017	OCTA-CDD	458/460 (87/100)	458+460	1.609	18557300		85.8		

*** = THEORETICAL CALCULATION

GC/MS ANALYST:	KELLY T.	ANALYSIS DATE:	8/26/87	REVIEWED:	DATE: 10/16/87
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	8/27/87	REVIEWED:	DATE: 2/3/87
DATA ENTRY:	MIKE MOLLOY/MBS	ENTRY DATE:	8/27/87,1/30/89	REVIEWED:	DATE:

DFT2023I

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF ASH EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L09
GC/MS DATA FILE: 8691H25X8
SAMPLE ID: 2023 (BENZENE)

RECOVERY INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	2.50 NG
13C-1,2,3,4,6,7,8-HpCDF	10.0 NG

METHOD INTERNAL STANDARDS (ASH)

13C-1,2,3,4-TCDD	1.18 NG
13C-1,2,3,4,7,8-HxCDF	5.00 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG
13C-OCDF	12.5 NG
13C-OCDD	12.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,6,7,8-HxCDD	5.00 NG
13C-1,2,3,4,6,7,8-HpCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/21/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)	
1949	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	352	1.000	2646710	NA	2.50	NA	
2734	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420	1.000	9506940	NA	10.0	NA	
2430	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	1.313	4667640	3.74		74.8	
3058	13C-OCDF	454/456 (87/100)	456	0.880	6921756	8.27		66.2	***
1496	13C-1,2,3,4-TCDD	332/334 (76/100)	332	0.749	687624	0.87		73.8	
2559	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402	0.954	3437590	3.79		75.8	
3052	13C-OCDD	470/472 (87/100)	472	0.694	6095420	9.24		73.9	
1439	13C-2,3,7,8-TCDF	316/318 (76/100)	316	1.033	1197300	1.09		87.6	
1517	13C-2,3,7,8-TCDD	332/334 (76/100)	332	0.959	904252	0.89		71.3	
2120	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.633	731088	1.09		87.2	
2529	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	0.853	3065080	3.78		75.6	
2823	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.576	2613020	4.77		95.5	
NA	TOTAL-TETRA-CDF	304/306 (76/100)	304+306	3.190	794038462		425		
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	2.450	639388274		446		
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	1.902	386364406		218		
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	1.779	115991740		69.8		
3059	OCTA-CDF	442/444 (87/100)	442+444	1.733	9614510		10.0		
NA	TOTAL-TETRA-CDD	320/322 (76/100)	320+322	2.578	368598810		244		
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.244	371273110		283		
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	2.248	265070300		171		
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	1.434	121132900		123		
3053	OCTA-CDD	458/460 (87/100)	458+460	1.609	52701800		67.2		

*** = THEORETICAL CALCULATION

GC/MS ANALYST:	DAVE MILLS	ANALYSIS DATE:	8/25/87	REVIEWED:		DATE:	10/15/87
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	8/26/87	REVIEWED:		DATE:	2/6/89
DATA ENTRY:	MIKE MOLLOY/MBS	ENTRY DATE:	8/26/87,1/27/89	REVIEWED:		DATE:	

DFT2023R

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF ASH EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L09
GC/MS DATA FILE: 8691H25X9
SAMPLE ID: 2023 (BENZENE) REPLICATE INJ.

RECOVERY INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	2.50 NG
13C-1,2,3,4,6,7,8-HpCDF	10.0 NG

METHOD INTERNAL STANDARDS (ASH)

13C-1,2,3,4-TCDD	1.18 NG
13C-1,2,3,4,7,8-HxCDF	5.00 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG
13C-OCDF	12.5 NG
13C-OCDD	12.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,6,7,8-HxCDD	5.00 NG
13C-1,2,3,4,6,7,8-HpCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/21/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)	
1951	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	352	1.000	2876990	NA	2.50	NA	
2736	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420	1.000	11400500	NA	10.0	NA	
2432	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	1.313	5833720	3.90		78.0	
3061	13C-OCDF	454/456 (87/100)	456	0.880	8783006	8.75		70.0	***
1496	13C-1,2,3,4-TCDD	332/334 (76/100)	332	0.749	783813	0.91		77.4	
2562	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402	0.954	4145270	3.81		76.2	
3055	13C-OCDD	470/472 (87/100)	472	0.694	7907830	9.99		79.9	
1441	13C-2,3,7,8-TCDF	316/318 (76/100)	316	1.033	1368540	1.15		92.1	
1519	13C-2,3,7,8-TCDD	332/334 (76/100)	332	0.959	1030260	0.93		74.7	
2123	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.633	823104	1.13		90.3	
2532	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	0.853	3744790	3.85		77.0	
2825	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.576	3160280	4.81		96.3	
NA	TOTAL-TETRA-CDF	304/306 (76/100)	304+306	3.190	905506835		425		
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	2.450	722674706		442		
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	1.902	432372804		195		
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	1.779	133582910		64.3		
3062	OCTA-CDF	442/444 (87/100)	442+444	1.733	12462260		10.2		
NA	TOTAL-TETRA-CDD	320/322 (76/100)	320+322	2.578	392412100		228		
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.244	432468234		289		
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	2.248	337012596		181		
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	1.434	138123800		116		
3056	OCTA-CDD	458/460 (87/100)	458+460	1.609	61522300		60.4		

*** = THEORETICAL CALCULATION

GC/MS ANALYST: DAVE MILLS	ANALYSIS DATE:	8/25/87	REVIEWED:	DATE: 10/15/87
DATA ANALYST: MIKE MOLLOY	ANALYSIS DATE:	8/26/87	REVIEWED:	DATE: 2/6/89
DATA ENTRY: MIKE MOLLOY/MBS	ENTRY DATE:	8/26/87,1/27/89	REVIEWED:	DATE:

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF ASH EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L09
GC/MS DATA FILE: 8691H27X2
SAMPLE ID: 2024 (BENZENE)

RECOVERY INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	1.25 NG	###
13C-1,2,3,4,6,7,8-HpCDF	5.00 NG	###

METHOD INTERNAL STANDARDS (ASH)

13C-1,2,3,4-TCDD	1.18 NG
13C-1,2,3,4,7,8-HxCDF	5.00 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG
13C-OCDF	12.5 NG
13C-OCDD	12.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25
13C-2,3,7,8-TCDD	1.25
13C-1,2,3,7,8-PeCDD	1.25
13C-1,2,3,6,7,8-HxCDD	5.00
13C-1,2,3,4,6,7,8-HpCDD	5.00

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/21/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)	
1912	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	352	1.000	2006070	NA	1.25	NA	
2694	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420	1.000	7172730	NA	5.0	NA	
2389	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	1.313	8217340	4.36		87.3	
3018	13C-OCDF	454/456 (87/100)	456	0.880	12289960	9.73		77.8	***
1467	13C-1,2,3,4-TCDD	332/334 (76/100)	332	0.749	1175910	0.98		83.3	
2518	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402	0.954	5930360	4.33		86.6	
3012	13C-OCDD	470/472 (87/100)	472	0.694	11092200	11.14		89.1	
1413	13C-2,3,7,8-TCDF	316/318 (76/100)	316	1.033	2043830	1.23		98.6	
1489	13C-2,3,7,8-TCDD	332/334 (76/100)	332	0.959	1495640	0.97		77.8	
2081	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.633	1257770	1.24		99.0	
2488	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	0.853	5064950	4.14		82.8	
2782	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.576	4204150	5.09		101.8	
NA	TOTAL-TETRA-CDF	304/306 (76/100)	304+306	3.190	1211882912		380		
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	2.450	836973731		341		
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	1.902	504941247		162		
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	1.779	139854120		47.8		
3018	OCTA-CDF	442/444 (87/100)	442+444	1.733	14046330		8.24		
NA	TOTAL-TETRA-CDD	320/322 (76/100)	320+322	2.578	555464850		215		
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.244	596081000		265		
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	2.248	421252402		158		
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	1.434	159258400		93.6		
3012	OCTA-CDD	458/460 (87/100)	458+460	1.609	79619500		55.8		

= RIS ADDED AT 1/2 NORMAL AMOUNT

*** = THEORETICAL CALCULATION

GC/MS ANALYST:	KELLY T.	ANALYSIS DATE:	8/27/87	REVIEWED:	DATE: 10/15/87
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	8/28/87	REVIEWED:	DATE: 2/6/88
DATA ENTRY:	MIKE MOLLOY/MBS	ENTRY DATE:	8/28/87,1/30/89	REVIEWED:	DATE:

DFT2025X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF ASH EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L09
GC/MS DATA FILE: 8691H23X6
SAMPLE ID: 2025 (TOLUENE)

RECOVERY INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	2.50 NG
13C-1,2,3,4,6,7,8-HpCDF	10.0 NG

METHOD INTERNAL STANDARDS (ASH)

13C-1,2,3,4-TCDD	1.18 NG
13C-1,2,3,4,7,8-HxCDF	5.00 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG
13C-OCDF	12.5 NG
13C-OCDD	12.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25
13C-2,3,7,8-TCDD	1.25
13C-1,2,3,7,8-PeCDD	1.25
13C-1,2,3,6,7,8-HxCDD	5.00
13C-1,2,3,4,6,7,8-HpCDD	5.00

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/21/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
1943	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	352	1.000	841576	NA	2.50	NA
2721	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420	1.000	3389400	NA	10.0	NA
2418	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	1.313	1708980	3.84		76.8
3043	13C-OCDF	454/456 (87/100)	456	0.880	1983930	6.65		53.2
1495	13C-1,2,3,4-TCDD	332/334 (76/100)	332	0.749	242952	0.96		82.0
2546	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402	0.954	1291540	3.99		79.9
3037	13C-OCDD	470/472 (87/100)	472	0.694	2290820	9.74		77.9
1438	13C-2,3,7,8-TCDF	316/318 (76/100)	316	1.033	315780	0.91		72.7
1517	13C-2,3,7,8-TCDD	332/334 (76/100)	332	0.959	276556	0.86		68.5
2112	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.633	271936	1.28		102.0
2517	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	0.853	1073130	3.71		74.2
2809	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.576	856974	4.39		87.8
NA	TOTAL-TETRA-CDF	304/306 (76/100)	304+306	3.190	267380131		405	
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	2.450	264692718		523	
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	1.902	141746826		218	
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	1.779	60398710		99.3	
3043	OCTA-CDF	442/444 (87/100)	442+444	1.733	3533030		12.8	
NA	TOTAL-TETRA-CDD	320/322 (76/100)	320+322	2.578	129162758		242	
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.244	159904316		345	
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	2.248	148795179		256	
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	1.434	61536500		166	
3037	OCTA-CDD	458/460 (87/100)	458+460	1.609	22543600		76.4	

GC/MS ANALYST:	RICK R.	ANALYSIS DATE:	8/23/87	REVIEWED:	DATE: 10/15/87
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	8/26/87	REVIEWED:	DATE: 2/3/88
DATA ENTRY:	MIKE MOLLOY/MBS	ENTRY DATE:	8/26/87,10/1/87	REVIEWED:	DATE:

DFT2026X

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF ASH EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L09
GC/MS DATA FILE: 8691H28X1
SAMPLE ID: 2026 (TOLUENE)

RECOVERY INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	2.50 NG
13C-1,2,3,4,6,7,8-HpCDF	10.0 NG

METHOD INTERNAL STANDARDS (ASH)

13C-1,2,3,4-TCDD	1.18 NG
13C-1,2,3,4,7,8-HxCDF	5.00 NG
13C-1,2,3,7,8,9-HxCDD	5.00 NG
13C-OCDF	12.5 NG
13C-OCDD	12.5 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	1.25 NG
13C-2,3,7,8-TCDD	1.25 NG
13C-1,2,3,7,8-PeCDD	1.25 NG
13C-1,2,3,6,7,8-HxCDD	5.00 NG
13C-1,2,3,4,6,7,8-HpCDD	5.00 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/21/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)	
1940	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	352	1.000	1933240	NA	2.50	NA	
2719	13C-1,2,3,4,6,7,8-HpCDF	420/422 (100/98)	420	1.000	6312830	NA	10.0	NA	
2416	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	1.313	4258110	5.14		102.8	
3041	13C-OCDF	454/456 (87/100)	456	0.880	5452587	9.81		78.5	***
1493	13C-1,2,3,4-TCDD	332/334 (76/100)	332	0.749	655984	1.13		96.4	
2545	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402	0.954	2986520	4.96		99.1	
3035	13C-OCDD	470/472 (87/100)	472	0.694	5178940	11.82		94.6	
1437	13C-2,3,7,8-TCDF	316/318 (76/100)	316	1.033	1043280	1.31		104.5	
1515	13C-2,3,7,8-TCDD	332/334 (76/100)	332	0.959	798048	1.08		86.1	
2109	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.633	604624	1.23		98.8	
2515	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	0.853	2401180	4.46		89.2	
2808	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.576	1885880	5.19		103.8	
NA	TOTAL-TETRA-CDF	304/306 (76/100)	304+306	3.190	863791580		485		
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	2.450	719037102		526		
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	1.902	396057478		244		
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	1.779	117720220		77.7		
3041	OCTA-CDF	442/444 (87/100)	442+444	1.733	8694420		11.5		
NA	TOTAL-TETRA-CDD	320/322 (76/100)	320+322	2.578	428518990		298		
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.244	440529972		352		
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	2.248	341152180		254		
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	1.434	140398900		164		
3035	OCTA-CDD	458/460 (87/100)	458+460	1.609	51580300		77.4		

*** = THEORETICAL CALCULATION

GC/MS ANALYST:	KELLY T.	ANALYSIS DATE:	8/28/87	REVIEWED:	DATE: 2/3/89
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	8/28/87	REVIEWED:	DATE:
DATA ENTRY:	MIKE MOLLOY/MBS	ENTRY DATE:	8/28/87,1/31/89	REVIEWED:	DATE:

SECTION 7

Runs 12 Through 17

DFT12008

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L14

GC/MS DATA FILE: 8691H06x2

MRI SAMPLE NO: 12008 UNCOATED BACK 1/2 AIR

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	5.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.50 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.50 NG
13C-1,2,3,4,6,7,8-HPCDD	20.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	25 NG
13C-1,2,3,7,8-HxCDF	25 NG
13C-OCDF	25 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	25 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/4/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2533	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	65590			NA
1485	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.330	47784	1.56		62.5
1560	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.834	39817	1.66		66.2
2150	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.932	22388	1.83		73.2
2821	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.478	133348	21.27		106.3
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.630	ND	0.0	.	0.0
2438	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	5.379	188397	4.7		18.9
3052	13C-OCDF	454/456 (87/100)	454+456	2.129	58222	4.1		16.4
1537	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.791	54544	1.9		8.1
2563	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.533	91563	3.0		12.1

GC/MS ANALYST: KELLY T.	ANALYSIS DATE: 8/6/87	REVIEWED: John Carter	DATE: 5/13/87
DATA ANALYST: M. MOLLOY	ANALYSIS DATE: 8/7/87	REVIEWED: ______	DATE: ______
DATA ENTRY: M. MOLLOY	ENTRY DATE: 8/7/87	REVIEWED: ______	DATE: ______

DFT12009

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L15
GC/MS DATA FILE: 8691H31RS
MRI SAMPLE NO: 12009 UNCOATED XAD
AIR

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	5.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.50 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.50 NG
13C-1,2,3,4,6,7,8-HPCDD	20.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	25.0 NG
13C-1,2,3,7,8-HxCDF	25.0 NG
13C-OCDF	25.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	25.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/31/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
1095	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	152413			NA
NA	13C-2,3,7,8-TCDF	316/318 (76/100)	316	NA	NA	NA		NA
NA	13C-2,3,7,8-TCDD	332/334 (76/100)	332	NA	NA	NA		NA
NA	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	NA	NA	NA		NA
1263	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.335	166848	16.3		81.7
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	NA	NA	NA		NA
1049	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	9.215	582747	7.58		30.3
1423	13C-OCDF	454/456 (87/100)	454+456	3.174	102329	3.86		15.5
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	NA	NA	NA		NA
1111	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	6.727	286793	5.1		20.4

GC/MS ANALYST:	FRED F.	ANALYSIS DATE:	8/31/87	REVIEWED:	DATE: 9/15/87
DATA ANALYST:	M. MOLLOY	ANALYSIS DATE:	9/1/87	REVIEWED:	DATE:
DATA ENTRY:	M. MOLLOY	ENTRY DATE:	9/1/87	REVIEWED:	DATE:

DFT12018

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L14

GC/MS DATA FILE: 8691H06X3

MRI SAMPLE NO: 12018 COATED BACK 1/2 AIR

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	5.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.50 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.50 NG
13C-1,2,3,4,6,7,8-HPCDD	20.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	25 NG
13C-1,2,3,7,8-HxCDF	25 NG
13C-OCDF	25 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	25 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/4/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2531	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	62158			NA
1475	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.330	51398	1.77		71.0
1552	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.834	62002	2.72		108.8
2146	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.932	26468	2.28		91.4
2820	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.478	75735	12.75		63.7
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.630	ND	0.0		0.0
2436	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	5.979	731992	32.3		129.3
3052	13C-OCDF	454/456 (87/100)	454+456	2.128	74851	9.3		37.2
1527	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.791	712255	16.0		68.2
2560	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.533	354273	20.6		82.6

GC/MS ANALYST:	KELLY T.	ANALYSIS DATE:	8/6/87	REVIEWED:	DATE: 8/15/87
DATA ANALYST:	M. MOLLOY	ANALYSIS DATE:	8/7/87	REVIEWED:	DATE:
DATA ENTRY:	M. MOLLOY	ENTRY DATE:	8/7/87	REVIEWED:	DATE:

DFT13008

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L14

GC/MS DATA FILE: 8691H04X1

MRI SAMPLE NO: 13008 UNCOATED BACK 1/2
AIR

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	200 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	6.25 NG
13C-2,3,7,8-TCDD	6.25 NG
13C-1,2,3,7,8-PeCDD	6.25 NG
13C-1,2,3,4,6,7,8-HPCDD	50.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	500 NG
13C-1,2,3,7,8-HxCDF	500 NG
13C-OCDF	500 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	500 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/4/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2535	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	580910			NA
1471	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.330	19869	2.94		47.0
1549	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.834	17102	3.21		51.4
2146	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.932	19160	7.08		113.3
2824	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.478	67098	48.35		96.7
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.630	ND	0.0		0.0
2439	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	5.979	1415084	176.4		35.3
3056	13C-OCDF	454/456 (87/100)	454+456	2.128	377951	132.3		26.5
1523	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.791	358512	73.1		15.6
2564	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.533	656565	107.9		21.6

GC/MS ANALYST: DAVE MILLS   ANALYSIS DATE: 8/4/87   REVIEWED: Jk Coats   DATE: 8/13/87

DATA ANALYST: M. MOLLOY   ANALYSIS DATE: 8/5/87   REVIEWED: ______   DATE: ______

DATA ENTRY: M. MOLLOY   ENTRY DATE: 9/5/87   REVIEWED: ______   DATE: ______

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L15

GC/MS DATA FILE: 8691H28R1

MRI SAMPLE NO: 13009 UNCOATED XAD AIR

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	25.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	6.25 NG
13C-2,3,7,8-TCDD	6.25 NG
13C-1,2,3,7,8-PeCDD	6.25 NG
13C-1,2,3,4,6,7,8-HPCDD	50.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	500 NG
13C-1,2,3,7,8-HxCDF	500 NG
13C-OCDF	500 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	500 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/28/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
1096	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	24606			NA
NA	13C-2,3,7,8-TCDF	316/318 (76/100)	316	NA	NA	NA		NA
NA	13C-2,3,7,8-TCDD	332/334 (76/100)	332	NA	NA	NA		NA
NA	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	NA	NA	NA		NA
1264	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.390	16989	44.3		88.5
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	NA	NA	NA		NA
1050	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	6.909	248948	106.05		21.2
1424	13C-OCDF	454/456 (87/100)	454+456	2.110	43999	61.37		12.3
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	NA	NA	NA		NA
1112	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	5.511	136078	72.7		14.5

GC/MS ANALYST:	FRED F.	ANALYSIS DATE:	8/28/87	REVIEWED:	DATE: 8/15/87
DATA ANALYST:	M. MOLLOY	ANALYSIS DATE:	9/1/87	REVIEWED:	DATE:
DATA ENTRY:	M. MOLLOY	ENTRY DATE:	9/1/87	REVIEWED:	DATE:

DFT13018

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L14

GC/MS DATA FILE: 8691H04X2

MRI SAMPLE NO: 13018 COATED BACK 1/2 AIR

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	200.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.38 NG
13C-2,3,7,8-TCDD	4.38 NG
13C-1,2,3,7,8-PeCDD	4.38 NG
13C-1,2,3,4,6,7,8-HPCDD	35.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	500 NG
13C-1,2,3,7,8-HxCDF	500 NG
13C-OCDF	500 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	500 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/4/87)	TOTAL AREA	SURROGATE RECOVERY -(NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2530	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	561276			NA
1457	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.330	13089	2.00		45.7
1534	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.834	20851	4.05		92.6
2137	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.932	13685	5.23		119.6
2821	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.478	36863	27.49		78.5
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.630	ND	0.0		0.0
2433	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	5.979	4206960	668.1		133.6
3053	13C-OCDF	454/456 (87/100)	454+456	2.128	1015435	453.1		90.6
1508	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.791	2680610	314.0		66.8
2559	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.533	2137876	447.7		89.5

GC/MS ANALYST:	DAVE MILLS	ANALYSIS DATE:	8/4/87	REVIEWED:	DATE: 8/12/87
DATA ANALYST:	M. MOLLOY	ANALYSIS DATE:	8/5/87	REVIEWED:	DATE:
DATA ENTRY:	M. MOLLOY	ENTRY DATE:	8/5/87	REVIEWED:	DATE:

DFT14009

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L14

GC/MS DATA FILE: 8691H19R4

MRI SAMPLE NO: 14009 UNCOATED XAD
KEROSENE

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	100 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	6.25 NG
13C-2,3,7,8-TCDD	6.25 NG
13C-1,2,3,7,8-PeCDD	6.25 NG
13C-1,2,3,4,6,7,8-HPCDD	50.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	500 NG
13C-1,2,3,7,8-HxCDF	500 NG
13C-OCDF	500 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	500 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/19/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
1115	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	80714			NA
NA	13C-2,3,7,8-TCDF	316/318 (76/100)	316		NA	NA		NA
NA	13C-2,3,7,8-TCDD	332/334 (76/100)	332		NA	NA		NA
NA	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368		NA	NA		NA
1286	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.466	23238	61.8		123.5
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352		NA	NA		NA
1069	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	7.906	687156	187.0		37.4
1450	13C-OCDF	454/456 (87/100)	454+456	3.179	146378	99.1		19.8
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334		NA	NA		NA
1131	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.452	304298	147.1		29.4

GC/MS ANALYST: FRED F. ANALYSIS DATE: 8/19/87 REVIEWED:______ DATE: 5/16/88

DATA ANALYST: M. MOLLOY ANALYSIS DATE: 8/20/87 REVIEWED:______ DATE:______

DATA ENTRY: M. MOLLOY ENTRY DATE: 8/20/87 REVIEWED:______ DATE:______

DF14018A

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L14

GC/MS DATA FILE: 8691H06X8

MRI SAMPLE NO: 14018 COATED BACK 1/2
KEROSENE

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	100.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	6.25 NG
13C-2,3,7,8-TCDD	6.25 NG
13C-1,2,3,7,8-PeCDD	6.25 NG
13C-1,2,3,4,6,7,8-HPCDD	50.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	500 NG
13C-1,2,3,7,8-HxCDF	500 NG
13C-OCDF	500 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	500 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/4/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2535	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	37567			NA
1479	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.330	8245	9.42		150.7
1556	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.834	9371	13.60		217.6
2151	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.932	5846	16.70		267.2
2824	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.478	4945	27.55		55.1
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.630	ND	0.0		0.0
2439	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	5.979	625506	1057.8		211.6
3055	13C-OCDF	454/456 (87/100)	454+456	2.128	61655	293.0		58.6
1530	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.791	1489032	554.4		118.0
2564	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.533	349500	779.5		155.9

GC/MS ANALYST:	D. MILLS	ANALYSIS DATE:	8/6/87	REVIEWED: Mike	DATE: 8/20/87
DATA ANALYST:	J. PALAUSKY	ANALYSIS DATE:	8/7/87	REVIEWED:	DATE:
DATA ENTRY:	J.PALAUSKY	ENTRY DATE:	8/7/87	REVIEWED:	DATE:

DFT14019

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L14

GC/MS DATA FILE: 8691H19R5

MRI SAMPLE NO: 14019 COATED XAD
KEROSENE

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	100 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	6.25 NG
13C-2,3,7,8-TCDD	6.25 NG
13C-1,2,3,7,8-PeCDD	6.25 NG
13C-1,2,3,4,6,7,8-HPCDD	50.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	500 NG
13C-1,2,3,7,8-HxCDF	500 NG
13C-OCDF	500 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	500 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/19/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
1116	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	91560			NA
NA	13C-2,3,7,8-TCDF	316/318 (76/100)	316		NA	NA		NA
NA	13C-2,3,7,8-TCDD	332/334 (76/100)	332		NA	NA		NA
NA	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368		NA	NA		NA
1286	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.466	30674	71.9		143.7
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352		NA	NA		NA
1070	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	7.906	27712	5.71		1.14
1450	13C-OCDF	454/456 (87/100)	454+456	3.179	8256	4.23		0.85
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334		NA	NA		NA
1132	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.452	16856	6.17		1.23

GC/MS ANALYST:	FRED F.	ANALYSIS DATE:	8/19/87	REVIEWED:	DATE: 8/22/87
DATA ANALYST:	M. MOLLOY	ANALYSIS DATE:	8/20/87	REVIEWED:	DATE:
DATA ENTRY:	M. MOLLOY	ENTRY DATE:	8/20/87	REVIEWED:	DATE:

OFT15008

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L14

GC/MS DATA FILE: 8691H06X4

MRI SAMPLE NO: 15008 UNCOATED BACK 1/2
KEROSENE

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	5.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.50 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.50 NG
13C-1,2,3,4,6,7,8-HPCDD	20.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	25 NG
13C-1,2,3,7,8-HxCDF	25 NG
13C-OCDF	25 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	25 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/4/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2531	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	70185			NA
1476	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.330	71942	2.20		88.0
1552	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.834	61706	2.40		95.9
2144	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.932	36665	2.80		112.1
2819	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.478	138462	20.64		103.2
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.630	ND	0.0		0.0
2436	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	5.979	145354	3.5		14.0
3052	13C-OCDF	454/456 (87/100)	454+456	2.128	22650	1.5		6.1
1530	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.791	75829	1.7		7.3
2560	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.533	78159	2.5		10.0

GC/MS ANALYST:	K. THORNBURG	ANALYSIS DATE:	8/6/87	REVIEWED: Mike Molley	DATE: 8/20/87
DATA ANALYST:	J. PALAUSKY	ANALYSIS DATE:	8/7/87	REVIEWED:	DATE:
DATA ENTRY:	J. PALAUSKY	ENTRY DATE:	8/7/87	REVIEWED:	DATE:

DFT15009

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L14
GC/MS DATA FILE: 8691H19R2
MRI SAMPLE NO: 15009 UNCOATED XAD KEROSENE

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	5.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.50 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.50 NG
13C-1,2,3,4,6,7,8-HPCDD	20.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	25 NG
13C-1,2,3,7,8-HxCDF	25 NG
13C-OCDF	25 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	25 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/19/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
1116	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	127682			NA
NA	13C-2,3,7,8-TCDF	316/318 (76/100)	316		NA	NA		NA
NA	13C-2,3,7,8-TCDD	332/334 (76/100)	332		NA	NA		NA
NA	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368		NA	NA		NA
1287	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.466	231356	19.4		97.2
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352		NA	NA		NA
1069	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	7.906	1318050	14.41		57.7
1450	13C-OCDF	454/456 (87/100)	454+456	3.179	293070	7.97		31.9
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334		NA	NA		NA
1132	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.452	634886	12.3		49.3

GC/MS ANALYST: FRED F. ANALYSIS DATE: 8/19/87 REVIEWED: ________ DATE: 8/22/87
DATA ANALYST: M. MOLLOY ANALYSIS DATE: 8/20/87 REVIEWED: ________ DATE: ________
DATA ENTRY: M. MOLLOY ENTRY DATE: 8/20/87 REVIEWED: ________ DATE: ________

DF150188

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L14

GC/MS DATA FILE: 8691H06X7

MRI SAMPLE NO: 15018 COATED BACK 1/2 KEROSENE

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	5.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.50 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.50 NG
13C-1,2,3,4,6,7,8-HPCDD	20.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	25 NG
13C-1,2,3,7,8-HxCDF	25 NG
13C-OCDF	25 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	25 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/4/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
2534	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	32372			NA
1478	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.330	53413	3.54		141.7
1555	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.834	50062	4.22		168.7
2151	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	0.932	19161	3.18		127.0
2822	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.478	43708	14.13		70.6
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.630	ND	0.0		0.0
2439	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	5.979	367606	28.1		112.5
3054	13C-OCDF	454/456 (87/100)	454+456	2.128	25182	5.4		21.7
1531	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	1.791	731700	20.4		86.8
2563	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.533	183772	18.5		74.2

GC/MS ANALYST: D. MILLS ANALYSIS DATE: 8/6/87

DATA ANALYST: J. PALAUSKY ANALYSIS DATE: 8/7/87

DATA ENTRY: J. PALAUSKY ENTRY DATE: 8/7/87

REVIEWED: Mike Molly DATE: 8/20/87

REVIEWED: ____________ DATE: ________

REVIEWED: ____________ DATE: ________

DFT15019

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L14

GC/MS DATA FILE: 8691H19R3

MRI SAMPLE NO: 15019 COATED XAD KEROSENE

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	5.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.50 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.50 NG
13C-1,2,3,4,6,7,8-HPCDD	20.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	25 NG
13C-1,2,3,7,8-HxCDF	25 NG
13C-OCDF	25 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	25 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/19/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
1116	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	120692			NA
NA	13C-2,3,7,8-TCDF	316/318 (76/100)	316		NA	NA		NA
NA	13C-2,3,7,8-TCDD	332/334 (76/100)	332		NA	NA		NA
NA	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368		NA	NA		NA
1287	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.466	169658	15.1		75.4
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352		NA	NA		NA
1069	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	7.906	47382	0.71		2.83
1451	13C-OCDF	454/456 (87/100)	454+456	3.179	6215	0.23		0.92
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334		NA	NA		NA
1132	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	4.452	26826	0.71		2.84

GC/MS ANALYST:	FRED F.	ANALYSIS DATE:	8/19/87	REVIEWED:	DATE: 8/22/87
DATA ANALYST:	M. MOLLOY	ANALYSIS DATE:	8/20/87	REVIEWED:	DATE:
DATA ENTRY:	M. MOLLOY	ENTRY DATE:	8/20/87	REVIEWED:	DATE:

DFT16008

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L15

GC/MS DATA FILE: 8691H31R7

MRI SAMPLE NO: 16008 UNCOATED BACK 1/2 RINSE KEROSENE

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	5.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.50 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.50 NG
13C-1,2,3,4,6,7,8-HPCDD	20.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	25.0 NG
13C-1,2,3,7,8-HxCDF	25.0 NG
13C-OCDF	25.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	25.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/31/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
1095	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	166526			NA
NA	13C-2,3,7,8-TCDF	316/318 (76/100)	316	NA	NA	NA		NA
NA	13C-2,3,7,8-TCDD	332/334 (76/100)	332	NA	NA	NA		NA
NA	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	NA	NA	NA		NA
1263	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.335	229058	20.5		102.6
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	NA	NA	NA		NA
1049	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	9.215	544159	5.16		20.6
1423	13C-OCDF	454/456 (87/100)	454+456	3.174	193888	5.33		21.3
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	NA	NA	NA		NA
1111	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	6.727	397780	5.2		20.7

GC/MS ANALYST: FRED F. ANALYSIS DATE: 8/31/87 REVIEWED: JCoates DATE: 8/22/87

DATA ANALYST: M. MOLLOY ANALYSIS DATE: 9/1/87 REVIEWED: ____________ DATE: ________

DATA ENTRY: M. MOLLOY ENTRY DATE: 9/1/87 REVIEWED: ____________ DATE: ________

DFT16009

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L15

GC/MS DATA FILE: 8691H31R6

MRI SAMPLE NO: 16009 UNCOATED XAD KEROSENE

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	5.0 NG

LAB METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.50 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.50 NG
13C-1,2,3,4,6,7,8-HPCDD	20.0 NG

FIELD METHOD INTERNAL STANDARDS	
13C-1,2,3,7,8-PeCDF	25.0 NG
13C-1,2,3,7,8-HxCDF	25.0 NG
13C-OCDF	25.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	25.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/31/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
1095	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	143714			NA
NA	13C-2,3,7,8-TCDF	316/318 (76/100)	316	NA	NA	NA		NA
NA	13C-2,3,7,8-TCDD	332/334 (76/100)	332	NA	NA	NA		NA
NA	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	NA	NA	NA		NA
1263	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.335	220776	22.9		114.6
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	NA	NA	NA		NA
1049	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	9.215	873367	8.59		34.3
1423	13C-OCDF	454/456 (87/100)	454+456	3.174	200040	5.71		22.8
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	NA	NA	NA		NA
1111	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	6.727	560704	7.6		30.2

GC/MS ANALYST: FRED F. ANALYSIS DATE: 8/31/87 REVIEWED: J Coates DATE: 5/23/87

DATA ANALYST: M. MOLLOY ANALYSIS DATE: 9/1/87 REVIEWED:________ DATE:______

DATA ENTRY: M. MOLLOY ENTRY DATE: 9/1/87 REVIEWED:________ DATE:______

DFT16018

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L15

GC/MS DATA FILE: 8691H31R8

MRI SAMPLE NO: 16018 COATED BACK 1/2 RINSE KEROSENE

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	5.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.50 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.50 NG
13C-1,2,3,4,6,7,8-HPCDD	20.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	25.0 NG
13C-1,2,3,7,8-HxCDF	25.0 NG
13C-OCDF	25.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	25.0 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/31/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
1096	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	106735			NA
NA	13C-2,3,7,8-TCDF	316/318 (76/100)	316	NA	NA	NA		NA
NA	13C-2,3,7,8-TCDD	332/334 (76/100)	332	NA	NA	NA		NA
NA	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	NA	NA	NA		NA
1263	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.335	86803	12.1		50.7
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	NA	NA	NA		NA
1050	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	9.215	860603	21.52		86.1
1424	13C-OCDF	454/456 (87/100)	454+456	3.174	128071	9.30		37.2
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	NA	NA	NA		NA
1111	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	6.727	541773	18.6		74.2

GC/MS ANALYST:	FRED F.	ANALYSIS DATE:	8/31/87	REVIEWED:	DATE: 8/23/87
DATA ANALYST:	M. MOLLOY	ANALYSIS DATE:	9/1/87	REVIEWED:	DATE:
DATA ENTRY:	M. MOLLOY	ENTRY DATE:	9/1/87	REVIEWED:	DATE:

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DFT17008

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L15

GC/MS DATA FILE: 8691H31R1

MRI SAMPLE NO: 17008 UNCOATED BACK 1/2 RINSE KEROSENE

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	50.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	6.25 NG
13C-2,3,7,8-TCDD	6.25 NG
13C-1,2,3,7,8-PeCDD	6.25 NG
13C-1,2,3,4,6,7,8-HPCDD	50.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	500 NG
13C-1,2,3,7,8-HxCDF	500 NG
13C-OCDF	500 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	500 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/31/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
1094	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	56593			NA
NA	13C-2,3,7,8-TCDF	316/318 (76/100)	316	NA	NA	NA		NA
NA	13C-2,3,7,8-TCDD	332/334 (76/100)	332	NA	NA	NA		NA
NA	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	NA	NA	NA		NA
1262	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.335	21654	57.1		114.2
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	NA	NA	NA		NA
1048	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	9.215	448547	112.39		22.5
1422	13C-OCDF	454/456 (87/100)	454+456	3.174	93199	67.80		13.6
NA	13C-1,2.3,4-TCDD	332/334 (76/100)	332+334	NA	NA	NA		NA
1110	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	6.727	247174	84.8		17.0

GC/MS ANALYST: FRED F. ANALYSIS DATE: 8/31/87 REVIEWED: John Carter DATE: 8/24/87

DATA ANALYST: M. MOLLOY ANALYSIS DATE: 9/1/87 REVIEWED:________ DATE:______

DATA ENTRY: M. MOLLOY ENTRY DATE: 9/1/87 REVIEWED:________ DATE:______

DFT17009

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MMS EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L15

GC/MS DATA FILE: 8691H28R2

MRI SAMPLE NO: 17009 UNCOATED XAD KEROSENE

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	25.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	6.25 NG
13C-2,3,7,8-TCDD	6.25 NG
13C-1,2,3,7,8-PeCDD	6.25 NG
13C-1,2,3,4,6,7,8-HPCDD	50.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	500 NG
13C-1,2,3,7,8-HxCDF	500 NG
13C-OCDF	500 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	500 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/28/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
1095	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	36971			NA
NA	13C-2,3,7,8-TCDF	316/318 (76/100)	316	NA	NA	NA		NA
NA	13C-2,3,7,8-TCDD	332/334 (76/100)	332	NA	NA	NA		NA
NA	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	NA	NA	NA		NA
1264	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.390	30909	53.6		107.2
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	NA	NA	NA		NA
1050	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+368	6.909	553556	129.61		25.9
1424	13C-OCDF	454/456 (87/100)	454+456	2.110	88862	68.13		13.6
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	NA	NA	NA		NA
1111	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	5.511	346599	101.7		20.3

GC/MS ANALYST:	FRED F.	ANALYSIS DATE:	8/28/87	REVIEWED:		DATE:	8/22/57
DATA ANALYST:	M. MOLLOY	ANALYSIS DATE:	9/1/87	REVIEWED:		DATE:	
DATA ENTRY:	M. MOLLOY	ENTRY DATE:	9/1/87	REVIEWED:		DATE:	

DFT17018

SAMPLE SPREADSHEET FOR THE QUANTITATION OF TOTAL TETRA-OCTA CDD/CDF MM5 EXTRACTS

AMOUNT IN SAMPLE = (AREA(S)/AREA(IS))*(AMT.(IS)/RF)

PROJECT NO: 8691L15

GC/MS DATA FILE: 8691H31R2

MRI SAMPLE NO: 17018 COATED BACK 1/2 RINSE KEROSENE

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	50.0 NG

LAB METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	6.25 NG
13C-2,3,7,8-TCDD	6.25 NG
13C-1,2,3,7,8-PeCDD	6.25 NG
13C-1,2,3,4,6,7,8-HPCDD	50.0 NG

FIELD METHOD INTERNAL STANDARDS

13C-1,2,3,7,8-PeCDF	500 NG
13C-1,2,3,7,8-HxCDF	500 NG
13C-OCDF	500 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	500 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS))*AMT.(IS)/RF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (8/31/87)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	SURROGATE RECOVERY (%)
1094	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	97347			NA
NA	13C-2,3,7,8-TCDF	316/318 (76/100)	316	NA	NA	NA		NA
NA	13C-2,3,7,8-TCDD	332/334 (76/100)	332	NA	NA	NA		NA
NA	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	NA	NA	NA		NA
1263	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.335	31952	49.0		98.0
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	NA	NA	NA		NA
1049	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	9.215	1818395	308.79		61.8
1423	13C-OCDF	454/456 (87/100)	454+456	3.174	479079	236.20		47.2
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	NA	NA	NA		NA
1110	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	6.727	1322472	307.6		61.5

GC/MS ANALYST: FRED F.
ANALYSIS DATE: 8/31/87
REVIEWED: ______ DATE: 8/22/87

DATA ANALYST: M. MOLLOY
ANALYSIS DATE: 9/1/87
REVIEWED: ______ DATE: ______

DATA ENTRY: M. MOLLOY
ENTRY DATE: 9/1/87
REVIEWED: ______ DATE: ______

SECTION 8

Runs 18 Through 21

F18005XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C01X1
SAMPLE ID: 18005-6 (CYCLONE/FILTER) IN 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD 9.80 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2660	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	2071290	NA	9.80	NA
1637	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	1011900	2.01	NA	83.7
1726	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	634208	1.85	NA	74.0
2304	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	439653	1.99	NA	80.2
2935	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	958980	6.52	NA	66.5
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	NA		NA	NA
2571	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	2.784 *	2718680		9.98	40.3
3174	13C-OCDF	454/456 (87/100)	454+456	1.946	1301016		6.83	28.5
1701	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	5226480		8.28	35.3
2687	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	3030720		9.11	37.2
3166	13C-OCDD	470/472 (87/100)	470+472	1.702	1918654		11.5	47.0

* = THE RRF WAS CALCULATED USING THE 386 ION ONLY AND NOT THE 386 + 388 ION.

GC/MS ANALYST: GENE O. ANALYSIS DATE: 3/1/88 DATA ENTRY REVIEWED: DATE: 4/15/88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/15/88 REVIEWED: Mike Molloy DATE: 3/15/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/15/88 REVIEWED:__________ DATE:________

F18005XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C01X1
SAMPLE ID: 18005-6 (CYCLONE/FILTER) IN 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	9.8 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA	AMOUNT IN SAMPLE (NG)
1551	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	28856400	26.4
1613	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	1114336	1.86
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	234391407	214
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	67753676	86.6
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	19386331	37.3
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	1492085	3.94
3084	OCTA-CDF	442/444 (87/100)	442+444	2.121	247450	1.19
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	18700523	31.1
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	12707780	24.6
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	8868360	25.6
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	4219120	14.2
3167	OCTA-CDD	458/460 (87/100)	458+460	1.378	1524470	7.87

GC/MS ANALYST: GENE O. ANALYSIS DATE: 3/1/88 REVIEWED: ________ DATE: ________

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/20/88 REVIEWED: Mike Molloy DATE: 5/20/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/23/88 REVIEWED: ________ DATE: 3/17/89

F18007XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C01X2
SAMPLE ID: 18007 (FRONT 1/2) IN 250

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	9.80 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2649	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1595470	NA	9.80	NA
1623	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	805264	2.07	NA	86.4
1712	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	523936	1.98	NA	79.4
2292	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	325908	1.91	NA	77.2
2924	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	717568	6.33	NA	64.6
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	NA		NA	NA
2560	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	2.784 *	942608		4.62	18.7
3163	13C-OCDF	454/456 (87/100)	454+456	1.946	559830		3.93	16.4
1687	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	2113214		4.05	17.3
2676	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	1040790		4.18	17.1
3155	13C-OCDD	470/472 (87/100)	470+472	1.702	673452		5.40	22.1

* = THE RRF WAS CALCULATED USING THE 386 ION ONLY AND NOT THE 386 + 388 ION.

GC/MS ANALYST: GENE O. ANALYSIS DATE: 3/1/88 DATA ENTRY REVIEWED: Timothy Grace DATE: 4/15/88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/9/88 REVIEWED: Mike Molloy DATE: 3/9/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/9/88 REVIEWED: ____________ DATE: ____________

F18007XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C01X2
SAMPLE ID: 18007 (FRONT 1/2) IN 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	9.8 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA	AMOUNT IN SAMPLE (NG)
1626	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	12941230	14.9
1714	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	225152	0.454
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	110204892	127
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	33524663	57.9
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	9603802	24.7
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	2072742	7.31
3164	OCTA-CDF	442/444 (87/100)	442+444	2.121	131564	0.847
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	8301484	16.7
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	5877142	15.3
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	4472056	17.3
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	2379775	10.7
3156	OCTA-CDD	458/460 (87/100)	458+460	1.978	812412	5.61

GC/MS ANALYST: GENE O. ANALYSIS DATE: 3/1/88 REVIEWED:________ DATE:______

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/17/88 REVIEWED: Mike Molloy DATE: 5/17/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/18/88 REVIEWED: DATE: 3/17/89

818008XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C23X6
SAMPLE ID: 18008 (BACK 1/2) IN 250

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	39.2 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2671	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	2356600	NA	39.2	NA
1629	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	288168	2.01	NA	83.8
1718	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	214216	2.20	NA	87.9
2309	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	174041	2.76	NA	112
2949	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	426352	10.19	NA	104
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	15796	ND <	0.070	0.287
2581	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	92069		0.431	1.74
3187	13C-OCDF	454/456 (87/100)	454+456	1.946	9888		0.117	0.487
1693	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	233537		1.10	4.66
2698	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	84796		0.573	2.34
3179	13C-OCDD	470/472 (87/100)	470+472	1.702	14892		0.201	0.821

GC/MS ANALYST:	DAVE MILLS	ANALYSIS DATE:	3/23/88	DATA ENTRY REVIEWED:	BHarrison	DATE:	4-18-88
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	3/24/88	REVIEWED:	Mike Molloy	DATE:	3/24/88
DATA ENTRY:	MIKE MOLLOY	ENTRY DATE:	3/24/88	REVIEWED:		DATE:	

818008XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C23X6
SAMPLE ID: 18008 (BACK 1/2) IN 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	39.2 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
1632	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	736696		2.37
NA	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	21457	ND<	0.106
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	7769320		24.9
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	1434262		4.64
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	191014		0.926
2865	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	22072		0.131
NA	OCTA-CDF	442/444 (87/100)	442+444	2.121	3804	ND<	0.0412
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	215880		1.064
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	46058		0.225
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	17118		0.111
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	6085		0.0461
3180	OCTA-CDD	458/460 (87/100)	458+460	1.978	11307		0.131

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/23/88 REVIEWED:________ DATE:______

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/19/88 REVIEWED: Mike Malloy DATE: 5/19/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/20/88 REVIEWED: John Costa DATE: 3/17/89

X18009XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C01X3
SAMPLE ID: 18009 (XAD) IN 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	9.80 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2642	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	2134950	NA	9.80	NA
1614	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	958808	1.85	NA	76.9
1702	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	617685	1.75	NA	69.9
2284	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	393992	1.73	NA	69.7
2919	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	852688	5.62	NA	57.4
2143	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	12378930		24.3	99.4
2553	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	359549		0.84	3.40
3159	13C-OCDF	454/456 (87/100)	454+456	1.946	46880		0.28	1.15
1678	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	1157808		1.88	8.02
2670	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	201018		0.68	2.77
3150	13C-OCDD	470/472 (87/100)	470+472	1.702	28740		0.19	0.792

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/1/88 DATA ENTRY REVIEWED: 35 DATE: 4/12/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/9/88 REVIEWED: Mike Molloy DATE: 3/9/88
DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/9/88 REVIEWED: DATE:

X18009XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 898SL09
GC/MS DATA FILE: 898SC01X3
SAMPLE ID: 18009 (XAD) IN 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD 9.8 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
1618	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	3435220		3.32
1704	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	59014		0.101
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	36907481		35.6
NA	TOTAL-PENTA-CDF	339/340 (61/100)	339+340	4.396	6317890		9.03
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	838878		1.81
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	85678		0.254
NA	OCTA-CDF	442/444 (87/100)	442+444	2.121	3041	ND<	0.0165
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	1960237		3.35
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	497270		1.07
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	135843		0.442
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	40165		0.152
3152	OCTA-CDD	458/460 (87/100)	458+460	1.978	28480		0.165

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/1/88 REVIEWED:________ DATE:________

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/19/88 REVIEWED: Mike Molloy DATE: 5/19/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/19/88 REVIEWED:________ DATE: 3/17/89

X18009RI

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C01X4
SAMPLE ID: 18009 (XAD) IN 250 (REPLICATE INJ.)

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	9.80 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2648	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1982630	NA	9.80	NA
1623	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	841018	1.84	NA	76.5
1711	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	510848	1.64	NA	65.6
2291	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	354248	1.76	NA	71.1
2924	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	722288	5.40	NA	55.1
2151	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	11402550		24.9	101.8
2559	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	318277		0.88	3.55
3163	13C-OCDF	454/456 (87/100)	454+456	1.946	36295		0.25	1.05
1686	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	1059648		2.09	8.87
2675	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	165380		0.66	2.69
3156	13C-OCDD	470/472 (87/100)	470+472	1.702	24956		0.20	0.812

GC/MS ANALYST:	DAVE MILLS	ANALYSIS DATE:	3/1/88	DATA ENTRY REVIEWED:	BS	DATE:	5/16/88
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	3/9/88	REVIEWED:	Mike Molloy	DATE:	3/9/88
DATA ENTRY:	MIKE MOLLOY	ENTRY DATE:	3/9/88	REVIEWED:		DATE:	

X18009RI

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C01X4
SAMPLE ID: 18009 (XAD) IN 250 (REPLICATE INJ)

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	9.80 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
1626	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	2937400		3.23
1713	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	50388		0.104
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	35403869		39.0
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	5565452		8.84
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	686109		1.75
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	67654		0.237
NA	OCTA-CDF	442/444 (87/100)	442+444	2.121	8967	ND<	0.0574
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	1774264		3.67
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	348144		0.835
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	90399		0.347
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	31844		0.142
3156	OCTA-CDD	458/460 (87/100)	458+460	1.978	20788		0.143

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/1/88 REVIEWED:__________ DATE:________

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/16/88 REVIEWED: Mike Molloy DATE: 5/16/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/16/88 REVIEWED: J Bates DATE: 3/17/88

C18015XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C01X5
SAMPLE ID: 18015-16 (CYCLONE/FILTER) IN 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	9.80 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2640	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	2113950	NA	9.80	NA
1611	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	1123100	2.18	NA	91.0
1698	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	784032	2.24	NA	89.6
2291	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	542536	2.40	NA	97.0
2916	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	1081430	7.20	NA	73.5
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	NA		NA	NA
2550	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	2.784 *	4094650		13.3	53.9
3155	13C-OCDF	454/456 (87/100)	454+456	1.946	3159250		14.7	61.3
1674	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	7302780		9.4	39.8
2667	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	4392660		11.7	47.8
3149	13C-OCDD	470/472 (87/100)	470+472	1.702	2999540		16.0	65.2

* = THE RRF WAS CALCULATED USING THE 386 ION AND NOT THE 386 + 388 ION.

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/1/88
DATA ENTRY REVIEWED: ______ DATE: [illegible]

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/9/88
REVIEWED: Mike Molloy DATE: 3/9/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/9/88
REVIEWED: ______ DATE: ______

C1801SXX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C01X5
SAMPLE ID: 18015-16 (CYCLONE/FILTER) IN 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	9.80 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA	AMOUNT IN SAMPLE (NG)
1614	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	42882900	35.3
1701	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	798176	1.075
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	339141856	279
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	119750128	124
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	37365029	63.7
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	9276642	21.7
3156	OCTA-CDF	442/444 (87/100)	442+444	2.121	929380	3.97
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	27741939	37.4
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	22930737	35.9
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	18970678	48.6
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	9619640	29.7
3149	OCTA-CDD	458/460 (87/100)	458+460	1.978	4124500	18.9

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/1/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/16/88
DATA ENTRY: P. PERKINS ENTRY DATE: 5/17/88

REVIEWED:________________ DATE:________
REVIEWED: Mike Molloy DATE: 5/16/88
REVIEWED: DATE: 3/17/89

F18017XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 898SL09
GC/MS DATA FILE: 898SC02X1
SAMPLE ID: 18017 (FRONT 1/2) IN 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	9.80 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN. NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2667	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1929470	NA	9.80	NA
1648	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	943424	2.01	NA	83.7
1736	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.522	587904	1.84	NA	73.6
2312	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	392216	1.90	NA	76.8
2940	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	933176	6.81	NA	69.5
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	NA		NA	NA
2578	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	2.784 *	1312190		4.95	20.0
3175	13C-OCDF	454/456 (87/100)	454+456	1.946	1088048		5.87	24.5
1713	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	2667170		4.56	19.4
2694	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	1447056		4.47	18.2
3167	13C-OCDD	470/472 (87/100)	470+472	1.702	1073380		6.62	27.0

* = THE RRF WAS CALCULATED USING THE 386 ION ONLY AND NOT THE 386 + 388 ION.

GC/MS ANALYST: RICK R. ANALYSIS DATE: 3/2/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/9/88
DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/9/88

DATA ENTRY REVIEWED: JF DATE: 4/7/88
REVIEWED: Mike Molloy DATE: 3/9/88
REVIEWED: DATE:

F18017XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C02X1
SAMPLE ID: 18017 (FRONT 1/2) IN 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	9.8 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA	AMOUNT IN SAMPLE (NG)
1651	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	15538170	15.2
1739	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	260872	0.469
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	143452535	141
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	42462214	60.9
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	13438429	26.6
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	3331017	9.029
3176	OCTA-CDF	442/444 (87/100)	442+444	2.121	305058	1.51
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	11407391	20.5
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	7917870	17.1
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	7390482	21.96
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	3858318	13.3
3168	OCTA-CDD	458/460 (87/100)	458+460	1.978	1553512	8.25

GC/MS ANALYST: R. ROBSON ANALYSIS DATE: 3/2/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/17/88
DATA ENTRY: P. PERKINS ENTRY DATE: 5/18/88

REVIEWED: ____________ DATE: ________
REVIEWED: Mike Molloy DATE: 5/17/88
REVIEWED: DATE: 3/17/59

B10018XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985B29X1
SAMPLE ID: 10018 (BACK 1/2) IN 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	9.80 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.8 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2642	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1390120	NA	9.80	NA
1615	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	757792	2.24	NA	93.4
1704	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	551616	2.40	NA	95.9
2296	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	352392	2.37	NA	95.8
2917	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	523064	5.30	NA	54.0
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	15612	ND<	0.0343	
2553	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	138851		0.529	2.14
3156	13C-OCDF	454/456 (87/100)	454+456	1.946	5027		0.0484	0.202
1679	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	463350		0.844	3.59
2670	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	97139		0.535	2.19
NA	13C-OCDD	470/472 (87/100)	470+472	1.702	7373	ND<	0.0811	0.331

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 2/29/88 DATA ENTRY REVIEWED: Timothy Chace DATE: 4/15/88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/9/88 REVIEWED: Mike Molloy DATE: 3/9/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/9/88 REVIEWED:________ DATE:______

818018XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985B29X1
SAMPLE ID: 18018 (BACK 1/2) IN 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	9.8 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
1618	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	1682328		2.054
1704	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	29807		0.0571
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	18701838		22.8
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	2924551		4.67
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	435309		1.54
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	29969		0.145
NA	OCTA-CDF	442/444 (87/100)	442+444	2.121	4021	ND<	0.0355
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	927299		1.79
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	252230		0.608
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	80579		0.427
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	14241		0.0879
3151	OCTA-CDD	458/460 (87/100)	458+460	1.978	3035		0.0287

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 2/29/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/19/88
DATA ENTRY: P. PERKINS ENTRY DATE: 5/20/88

REVIEWED: ____________ DATE: ________
REVIEWED: Mike Molloy DATE: 5/19/88
REVIEWED: J Costa DATE: 3/17/89

X18019XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985B29X2
SAMPLE ID: 18019 (XAD) IN 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	9.80 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2642	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1530380	NA	9.80	NA
1616	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	732200	1.97	NA	81.9
1704	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	526640	2.08	NA	83.2
2286	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	303694	1.86	NA	75.0
2917	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	601472	5.53	NA	56.4
2145	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	10279290		26.2	107.0
2554	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	279130		0.925	3.74
3157	13C-OCDF	454/456 (87/100)	454+456	1.946	NA *			
1679	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	820308		1.57	6.66
2670	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	133552		0.640	2.61
3149	13C-OCDD	470/472 (87/100)	470+472	1.702	21798		0.209	0.852

* = SEE FILE X1819XO FOR 13C-OCDF QUANTITATION.

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE:- 2/29/88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/14/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/14/88

DATA ENTRY REVIEWED: Timothy Grace DATE: 4/15/88

REVIEWED: Mike Molloy DATE: 3/14/88

REVIEWED: ____________ DATE: ____________

X18019XO

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985B29X2
SAMPLE ID: 18019 (XAD) IN 250

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	9.80 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (PEAK HEIGHT(S)/PEAK HEIGHT(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (PEAK HEIGHT(S)/PEAK HEIGHT(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	PEAK HEIGHT	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2642	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	275968	NA	9.90	NA
2917	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.738	110976	5.34	NA	54.5
3157	13C-OCDF	454/456 (87/100)	454	0.999	1716		0.169	0.717

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 2/29/88 DATA ENTRY REVIEWED: Timothy [illegible] DATE: 4/15/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/30/88 REVIEWED: Mike Molloy DATE: 3/20/88
DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/30/88 REVIEWED: ____________ DATE: ________

X18019XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985B29X2
SAMPLE ID: 18019 (XAD) IN 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	9.8 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA	AMOUNT IN SAMPLE (NG)
1619	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	3823830	4.83
1706	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	62569	0.125
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	41396696	52.3
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	7515182	13.9
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	1054984	3.24
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	89054	0.374
3157	OCTA-CDF	442/444 (87/100)	442+444	2.121	1890	0.0145
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	2199697	4.41
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	556828	1.56
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	171977	0.793
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	39333	0.211
3150	OCTA-CDD	458/460 (87/100)	458+460	1.978	8741	0.0720

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 2/29/88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/19/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/20/88

REVIEWED:________________ DATE:________

REVIEWED: Mike Molloy DATE: 5/19/88

REVIEWED:________________ DATE: 3/17/89

X18019RI

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C02X2
SAMPLE ID: 18019 (XAD) IN 250 (REPLICATE INJ.)

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	9.80 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
- 2663	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1658660	NA	9.80	NA
1640	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	878320	2.18	NA	90.7
1731	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	596074	2.17	NA	86.9
2307	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	342996	1.93	NA	78.1
- 2937	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	738176	6.26	NA	63.9
2169	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	10598970		23.9	97.7
2575	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	290000		0.783	3.16
- 3172	13C-OCDF	454/456 (87/100)	454+456	1.946	NA *			
1705	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	914037		1.54	6.56
2690	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	143204		0.559	2.28
3164	13C-OCDD	470/472 (87/100)	470+472	1.702	25327		0.198	0.806

* = UNABLE TO RESOLVE PEAK. SEE FILE 18019RIO FOR QUANTITATION OF PEAK.

GC/MS ANALYST: RICK R. ANALYSIS DATE: 3/2/88 DATA ENTRY REVIEWED: [illegible] DATE: [illegible]

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/9/88 REVIEWED: Mike Molloy DATE: 3/9/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/9/88 REVIEWED: ________ DATE: ________

18019RIO

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C02X2
SAMPLE ID: 18019 (XAD) IN 250 (REPLICATE INJ.)

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	9.80 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (PEAK HEIGHT(S)/PEAK HEIGHT(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (PEAK HEIGHT(S)/PEAK HEIGHT(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	PEAK HEIGHT	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2663	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	307712	NA	9.80	NA
2937	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	154112	7.05	NA	71.9
3172	13C-OCDF	454/456 (87/100)	454	1.946	3256		0.106	0.443

GC/MS ANALYST: RICK R. ANALYSIS DATE: 3/2/88 DATA ENTRY REVIEWED: DATE: 4/12/88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/30/88 REVIEWED: Mike Molloy DATE: 3/30/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/30/88 REVIEWED: DATE:

X18019RI

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 898SL09
GC/MS DATA FILE: 898SC02X2
SAMPLE ID: 18019 (XAD) IN 250 (REPLICATE INJ.)

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	9.8 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA	AMOUNT IN SAMPLE (NG)
1645	2,3,7,9-TCDF	304/306 (75/100)	304+306	2.594	4284630	4.51
1732	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	71531	0.127
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	50197469	52.9
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	7899879	12.97
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	1139293	2.85
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	120857	0.414
3173	OCTA-CDF	442/444 (97/100)	442+444	2.121	3252	0.0204
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	2441068	4.324
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	552729	1.37
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	196259	0.737
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	53508	0.234
3166	OCTA-CDD	458/460 (87/100)	458+460	1.978	24849	0.167

GC/MS ANALYST: R. ROBSON ANALYSIS DATE: 3/2/88 REVIEWED:________ DATE:______

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/17/88 REVIEWED: Mike Molloy DATE: 5/17/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/18/88 REVIEWED: J Gates DATE: 7/11/88

C18026XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C02X4
SAMPLE ID: 18026 (FILTER) OUT 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	9.80 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2661	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1352600	NA	9.80	NA
1641	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	627936	1.91	NA	79.5
1731	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	551104	2.46	NA	98.5
2307	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	279205	1.93	NA	78.0
2935	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	599616	6.24	NA	63.7
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	NA		NA	NA
2574	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	2.784 *	54251		0.318	1.29
3169	13C-OCDF	454/456 (87/100)	454+456	1.946	93647		0.786	3.28
1706	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	115634		0.211	0.898
2688	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	105362		0.507	2.07
3161	13C-OCDD	470/472 (87/100)	470+472	1.702	89228		0.857	3.50

* = THE RRF WAS CALCULATED USING THE 386 ION ONLY AND NOT THE 386 + 388 ION.

GC/MS ANALYST: RICK R. ANALYSIS DATE: 3/2/88 DATA ENTRY REVIEWED: MBS DATE: 4/18/88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/9/88 REVIEWED: Mike Molloy DATE: 3/9/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/9/88 REVIEWED: ________ DATE: ________

C18026XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C02X4
SAMPLE ID: 18026 (FILTER) OUT 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	9.8 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA	AMOUNT IN SAMPLE (NG)
1644	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	260696	0.384
1733	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	9519	0.0182
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	2215149	3.26
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	693803	1.40
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	218162	0.671
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	98523	0.416
3169	OCTA-CDF	442/444 (87/100)	442+444	2.121	11436	0.0881
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	154352	0.296
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	121069	0.368
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	188095	0.870
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	164014	0.883
3163	OCTA-CDD	458/460 (87/100)	458+460	1.978	134023	1.11

GC/MS ANALYST: R. ROBSON ANALYSIS DATE: 3/2/88 REVIEWED:__________ DATE:______

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/17/88 REVIEWED: Mike Molloy DATE: 5/17/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/18/88 REVIEWED: J Coates DATE: 3/17/89

F18027XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C02X5
SAMPLE ID: 18027 (FRONT 1/2) OUT 250

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	9.80 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2562	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1454630	NA	9.80	NA
1641	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	719080	2.03	NA	84.7
1730	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	500032	2.08	NA	83.1
2307	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	285676	1.84	NA	74.2
2936	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	643936	6.23	NA	63.6
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	NA		NA	NA
2575	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	2.784 *	11530		0.0630	0.255
3170	13C-OCDF	454/456 (87/100)	454+456	1.946	NA **			
1706	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	21828		0.0439	0.187
2691	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	61514		0.275	1.12
3165	13C-OCDD	470/472 (87/100)	470+472	1.702	8563		0.0766	0.312

* = THE RRF WAS CALCULATED USING THE 386 ION ONLY AND NOT THE 386 + 388 ION. ** = SEE FILE F18027X0 FOR QUANTITATION.

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/2/88 DATA ENTRY REVIEWED: BS DATE: 4/15/88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/9/88 REVIEWED: Mike Molloy DATE: 3/9/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/9/88 REVIEWED: ____________ DATE: ____________

F18027X0

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C02X5
SAMPLE ID: 18027 (FRONT 1/2) OUT 250

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	9.80 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (PEAK HEIGHT(S)/PEAK HEIGHT(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (PEAK HEIGHT(S)/PEAK HEIGHT(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	PEAK HEIGHT	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2662	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	269824	NA	9.80	NA
2936	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.738	125184	6.16	NA	62.9
3170	13C-OCDF	454/456 (87/100)	454	0.899	811		0.0706	0.294

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/2/88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/31/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/31/88

DATA ENTRY REVIEWED: BS DATE: 4/[illegible]/88

REVIEWED: Mike Molloy DATE: 3/31/88

REVIEWED: ____________ DATE: ____________

F18027XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C02XS
SAMPLE ID: 18027 (FRONT 1/2) OUT 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	9.8 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.18 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
1645	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	73149		0.0941
NA	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	17092	ND<	0.0361
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	348456		0.448
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	180732		0.356
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	71117		0.204
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	36439		0.143
3171	OCTA-CDF	442/444 (87/100)	442+444	2.121	7944		0.0570
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	13668		0.0289
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	9586		0.0285
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	98807		0.425
NA	TOTAL-HEPTA-CDD	424/425 (100/99)	424+426	3.036	109766		0.550
3163	OCTA-CDD	458/460 (87/100)	458+460	1.978	86937		0.669

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/2/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/17/88
DATA ENTRY: P. PERKINS ENTRY DATE: 5/18/88

REVIEWED:__________ DATE:______
REVIEWED: Mike Molloy DATE: 5/17/88
REVIEWED:__________ DATE: 3/17/88

918028XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C22X7
SAMPLE ID: 18028 (BACK 1/2) OUT 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	49.0 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2640	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1483000	NA	49.0	NA
1607	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	281552	3.90	NA	162.6
1694	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	210784	4.29	NA	171.8
2279	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	136170	4.29	NA	173.5
2917	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	261465	12.41	NA	126.6
2136	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	28420		0.162	0.660
2550	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	2029358		15.5	62.5
3153	13C-OCDF	454/456 (87/100)	454+456	1.946	621056		12.0	49.8
1669	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	2527590		12.1	51.3
2668	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	1099096		12.1	49.5
3146	13C-OCDD	470/472 (87/100)	470+472	1.702	523618		11.5	47.1

GC/MS ANALYST: DAVE MILLS   ANALYSIS DATE: 3/22/88
DATA ANALYST: MIKE MOLLOY   ANALYSIS DATE: 4/1/88
DATA ENTRY: MIKE MOLLOY   ENTRY DATE: 4/1/88

DATA ENTRY REVIEWED: PJHarrison DATE: 4-18-88
REVIEWED: Mike Molloy DATE: 4/1/88
REVIEWED: ____________ DATE: ____________

B18028X0

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C22X7
SAMPLE ID: 18028 (BACK 1/2) OUT 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	49.0 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (PEAK HEIGHT(S)/PEAK HEIGHT(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (PEAK HEIGHT(S)/PEAK HEIGHT(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	PEAK HEIGHT	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2640	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	225024	NA	49.0	NA
2917	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.738	40944	12.08	NA	123

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/22/88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/25/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 5/25/88

DATA ENTRY REVIEWED:__________ DATE:__________

REVIEWED: Mike Molloy DATE: 5/25/88

REVIEWED: DATE: 3/17/89

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Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C22X7
SAMPLE ID: 18029 (BACK 1/2) OUT 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	49 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA	AMOUNT IN SAMPLE (NG)
1610	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	5747090	18.9
1698	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	96191	0.482
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	48833412	160
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	12899375	53.3
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	4035369	28.5
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	1047615	10.1
3154	OCTA-CDF	442/444 (87/100)	442+444	2.121	70405	1.24
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	3529109	17.7
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	2156720	13.5
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	1211334	12.8
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	653734	8.07
NA	OCTA-CDD	458/460 (87/100)	458+460	1.978	NA *	

* = SEE FILE 818028X0 FOR PEAK HEIGHT QUANTITATION OF OCDD.

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/22/88 REVIEWED:________ DATE:________

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/19/88 REVIEWED: Mike Molloy DATE: 5/19/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/19/88 REVIEWED:________ DATE: 3/17/89

B18028N0

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C22X7
SAMPLE ID: 18028 (BACK 1/2) OUT 250

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	49 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,9-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (PEAK HEIGHT(S)/PEAK HEIGHT(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	PEAK HEIGHT	AMOUNT IN SAMPLE (NG)
3147	OCTA-CDD	458/460 (87/100)	460	0.924	28096	7.28

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/22/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/25/88
DATA ENTRY: P. PERKINS ENTRY DATE: 5/25/88

REVIEWED: ____________ DATE: ________
REVIEWED: Mike Molloy DATE: 5/25/88
REVIEWED: ____________ DATE: 3/17/89

X18029XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C02X6
SAMPLE ID: 18029 (XAD) OUT 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	9.80 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2661	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1790810	NA	9.80	NA
1637	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	916752	2.10	NA	87.7
1727	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	659072	2.22	NA	89.0
2305	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	390306	2.04	NA	82.4
2935	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	735300	5.78	NA	59.0
2167	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	12498480		24.8	101
2572	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	1610960		4.37	17.6
3171	13C-OCDF	454/456 (87/100)	454+456	1.946	NA *			
1701	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	2423870		3.70	15.7
2689	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	903208		3.54	14.5
3163	13C-OCDD	470/472 (87/100)	470+472	1.702	269566		2.11	8.61

* = SEE FILE X18029X0 FOR QUANTITATION.

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/2/88
DATA ENTRY REVIEWED: ______ DATE: 4/12/88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/9/88
REVIEWED: Mike Molloy DATE: 3/9/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/9/88
REVIEWED: ______ DATE: ______

X18029X0

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C02X6
SAMPLE ID: 18029 (XAD) OUT 250

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	9.80 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (PEAK HEIGHT(S)/PEAK HEIGHT(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (PEAK HEIGHT(S)/PEAK HEIGHT(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	PEAK HEIGHT	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2561	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	327168	NA	9.80	NA
2935	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.738	154112	6.26	NA	63.8
3171	13C-OCDF	454/456 (87/100)	454	0.899	22880		1.62	6.74

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/2/88 DATA ENTRY REVIEWED: TS DATE: 4/15/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/31/88 REVIEWED: Mike Molloy DATE: 3/31/88
DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/31/88 REVIEWED:______ DATE:______

X18029XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C02X6
SAMPLE ID: 18029 (XAD) OUT 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	9.8 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA	AMOUNT IN SAMPLE (NG)
1641	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	5002190	5.05
1729	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	87008	0.139
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	42290090	42.7
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	13576195	19.6
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	3795328	9.52
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	720473	2.48
3171	OCTA-CDF	442/444 (87/100)	442+444	2.121	31093	0.195
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	3292026	5.27
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	1800615	3.92
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	1607396	6.06
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	455006	2.00
3164	OCTA-CDD	458/460 (87/100)	458+460	1.978	152752	1.03

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/2/88 REVIEWED:____________ DATE:________

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/17/88 REVIEWED: Mike Molloy DATE: 5/17/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/18/88 REVIEWED: J Oates DATE: 3/17/85

F18036XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C02X7
SAMPLE ID: 18036 (FILTER) OUT 250

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	9.80 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2661	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1663900	NA	9.90	NA
1638	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	664672	1.64	NA	68.4
1727	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	402384	1.46	NA	58.5
2304	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	292044	1.64	NA	66.3
2934	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	602900	5.10	NA	52.0
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	NA		NA	NA
2573	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	2.784 *	54526		0.318	1.29
3171	13C-OCDF	454/456 (87/100)	454+456	1.946	101918		0.851	3.55
1701	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	71067		0.178	0.755
2688	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	121170		0.579	2.36
3163	13C-OCDD	470/472 (87/100)	470+472	1.702	113361		1.08	4.42

* = THE RRF WAS CALCULATED USING THE 386 ION ONLY AND NOT THE 386 + 388 ION.

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/2/88 DATA ENTRY REVIEWED: MBS DATE: 4/19/88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/9/88 REVIEWED: Mike Molloy DATE: 3/9/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/9/88 REVIEWED: ________ DATE: ________

(N 33

F18036XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C02X7
SAMPLE ID: 18036 (FILTER) OUT 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD 9.8 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
1641	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	566458		0.789
NA	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	13554	ND<	0.0356
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	3780374		5.26
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	1718294		3.31
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	535030		1.64
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	68815		0.289
3170	OCTA-CDF	442/444 (87/100)	442+444	2.121	34912		0.268
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	447413		1.17
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	517117		1.50
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	809912		3.72
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	531700		2.85
3163	OCTA-CDD	458/460 (87/100)	458+460	1.978	288296		2.37

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/2/88 REVIEWED:__________ DATE:________

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/17/88 REVIEWED: Mike Molloy DATE: 5/17/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/18/88 REVIEWED: DATE: 3/17/89

F18037XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C03X1
SAMPLE ID: 18037 (FRONT 1/2) OUT 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	9.80 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2639	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1193070	NA	9.80	NA
1626	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	526936	1.82	NA	75.6
1716	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	373568	1.89	NA	75.7
2286	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	234198	1.84	NA	74.2
2915	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	558280	6.59	NA	67.2
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	NA		NA	NA
2551	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	2.784 *	18106		0.114	0.461
3156	13C-OCDF	454/456 (87/100)	454+456	1.946	NA **			
1691	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	22497		0.0605	0.258
2665	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	59909		0.309	1.26
3146	13C-OCDD	470/472 (87/100)	470+472	1.702	30225		0.312	1.27

* = THE RRF WAS CALCULATED USING THE 386 ION ONLY AND NOT THE 386 + 388 ION. ** = SEE FILE F18037XO FOR QUANTATATION.

GC/MS ANALYST: KELLY T. ANALYSIS DATE: 3/3/88 DATA ENTRY REVIEWED: CRS DATE: 4/12/88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/9/88 REVIEWED: Mike Molloy DATE: 3/9/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/9/88 REVIEWED:________ DATE:________

F18037X0

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C03X1
SAMPLE ID: 18037 (FRONT 1/2) OUT 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	9.80 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (PEAK HEIGHT(S)/PEAK HEIGHT(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (PEAK HEIGHT(S)/PEAK HEIGHT(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	PEAK HEIGHT	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2639	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	196864	NA	9.80	NA
2915	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.738	109696	7.40	NA	75.5
3156	13C-OCDF	454/456 (87/100)	454	0.899	2712		0.270	1.12

GC/MS ANALYST: KELLY T. ANALYSIS DATE: 3/3/88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/31/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/31/88

DATA ENTRY REVIEWED: ______ DATE: 4/12/88

REVIEWED: Mike Molloy DATE: 3/31/88

REVIEWED: ______ DATE: ______

F18037XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C03X1
SAMPLE ID: 18037 (FRONT 1/2) OUT 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	9.8 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA	AMOUNT IN SAMPLE (NG)
1630	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	342608	0.602
1716	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	8125	0.0230
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	2308316	4.053
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	1131339	2.72
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	516823	1.71
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	275148	1.25
3155	OCTA-CDF	442/444 (87/100)	442+444	2.121	32865	0.272
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	205812	0.582
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	219880	0.798
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	414239	2.057
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	492817	2.85
3148	OCTA-CDD	458/460 (87/100)	458+460	1.978	422350	3.75

GC/MS ANALYST: K. THORNBURG   ANALYSIS DATE: 3/3/88   REVIEWED:________________ DATE:________

DATA ANALYST: MIKE MOLLOY   ANALYSIS DATE: 5/19/88   REVIEWED: Mike Molloy DATE: 5/19/88

DATA ENTRY: P. PERKINS   ENTRY DATE: 5/20/88   REVIEWED: DATE: 3/17/89

818038XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C22X8
SAMPLE ID: 18038 (BACK 1/2) OUT 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	49.0 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2645	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1927990	NA	49.0	NA
1613	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	378212	4.03	NA	168.0
1700	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	266624	4.18	NA	167.1
2285	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	204684	4.96	NA	200.6
2922	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	396320	14.47	NA	147.6
2143	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	32047		0.121	0.495
2556	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	1447160		7.28	29.4
3158	13C-OCDF	454/456 (87/100)	454+456	1.946	472215		6.00	25.0
1675	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	1532896		5.78	24.6
2673	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	841784		6.12	25.0
3151	13C-OCDD	470/472 (97/100)	470+472	1.702	381670		5.54	22.6

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/22/88 DATA ENTRY REVIEWED: PHarrison DATE: 4-18-88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 4/1/88 REVIEWED: Mike Molloy DATE: 4/1/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 4/1/88 REVIEWED:________ DATE:________

B18038XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C22X8
SAMPLE ID: 18038 (BACK 1/2) OUT 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	49 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA	AMOUNT IN SAMPLE (NG)
1615	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	3833270	9.38
1702	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	63312	0.251
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	32263440	78.9
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	10133350	27.9
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	3581793	16.7
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	999156	6.38
3159	OCTA-CDF	442/444 (87/100)	442+444	2.121	60566	0.706
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	2339084	9.26
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	1486084	6.17
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	1053955	7.37
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	558107	4.55
3151	OCTA-CDD	458/460 (87/100)	458+460	1.978	182236	2.28

GC/MS ANALYST: DAVE MILLS   ANALYSIS DATE: 3/22/88   REVIEWED: ____________ DATE: ________

DATA ANALYST: MIKE MOLLOY   ANALYSIS DATE: 5/19/88   REVIEWED: Mike Molloy DATE: 5/19/88

DATA ENTRY: P. PERKINS   ENTRY DATE: 5/19/88   REVIEWED: ____________ DATE: 3/17/89

X18039XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C23X3
SAMPLE ID: 18039 (XAD) OUT 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD 19.6 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2671	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1906270	NA	19.6	NA
1637	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	403752	1.74	NA	72.5
1726	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	235054	1.49	NA	59.6
2312	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	186784	1.83	NA	74.1
2947	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	498944	7.37	NA	75.2
2171	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	4976500		20.6	84.3
2581	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	2365540		9.45	38.2
3186	13C-OCDF	454/456 (87/100)	454+456	1.946	702924		7.09	29.6
1701	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	2873800		12.3	52.3
2598	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	1324000		7.65	31.2
3178	13C-OCDD	470/472 (87/100)	470+472	1.702	609004		7.03	28.7

GC/MS ANALYST: KELLY T. ANALYSIS DATE: 3/23/88 DATA ENTRY REVIEWED: Harrison DATE: 4-18-88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 4/1/88 REVIEWED: Mike Molloy DATE: 4/1/88
DATA ENTRY: MIKE MOLLOY ENTRY DATE: 4/1/98 REVIEWED: DATE:

X18039XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C23X3
SAMPLE ID: 18039 (XAD) OUT 250

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA	AMOUNT IN SAMPLE (NG)
1641	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	6770420	15.5
1728	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	77992	0.350
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	57498754	132
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	17760587	53.5
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	5789559	21.4
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	1487774	7.54
3186	OCTA-CDF	442/444 (87/100)	442+444	2.121	89649	0.830
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	4271553	19.2
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	2243901	10.2
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	1711167	9.51
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	862014	5.58
3174	OCTA-CDD	458/460 (87/100)	458+460	1.978	268522	2.67

GC/MS ANALYST:	K. THORNBURG	ANALYSIS DATE:	3/23/88	REVIEWED:	DATE:
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	5/19/88	REVIEWED: Mike Molloy	DATE: 5/19/88
DATA ENTRY:	P. PERKINS	ENTRY DATE:	5/20/88	REVIEWED:	DATE:

C19005XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8965C03X2
SAMPLE ID: 19005-6 (CYCLONE/FILTER) IN 420

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	9.80 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2639	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	929752	NA	9.80	NA
1621	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	357724	1.58	NA	65.9
1711	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	327176	2.13	NA	85.1
2285	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	176938	1.78	NA	71.9
2916	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	516906	7.83	NA	79.8
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	NA		NA	NA
2550	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	396	2.784 *	1076380		7.33	29.6
3156	13C-OCDF	454/456 (87/100)	454+456	1.946	1133943		11.0	46.0
1685	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	1596240		4.30	20.9
2639	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	1640922		9.15	37.4
3149	13C-OCDD	470/472 (87/100)	470+472	1.702	1160745		12.9	52.9

* = THE RRF WAS CALCULATED USING THE 386 ION ONLY AND NOT THE 396 + 388 ION.

GC/MS ANALYST: RICK R. ANALYSIS DATE: 3/3/88 DATA ENTRY REVIEWED: MBS DATE: 4/18/88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/9/88 REVIEWED: Mike Molloy DATE: 3/9/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/9/88 REVIEWED: DATE:

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C03X2
SAMPLE ID: 19005-6 (CYCLONE/FILTER) IN 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	9.8 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA	AMOUNT IN SAMPLE (NG)
1624	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	8027120	20.8
1714	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	89264	0.288
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	64442884	167
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	23164949	73.7
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	9892987	35.3
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	3113236	15.2
3157	OCTA-CDF	442/444 (87/100)	442+444	2.121	480774	4.30
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	38590385	125
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	17064419	81.9
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	13881576	74.5
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	7558230	47.2
3149	OCTA-CDD	458/460 (87/100)	458+460	1.978	3303580	31.7

GC/MS ANALYST: R. ROBSON ANALYSIS DATE: 3/3/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/19/68
DATA ENTRY: P. PERKINS ENTRY DATE: 5/20/88

REVIEWED:________________ DATE:________
REVIEWED: Mike Molloy DATE: 5/19/88
REVIEWED:________________ DATE: 3/15/89

F19007XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 898SL09
GC/MS DATA FILE: 898SC03X3
SAMPLE ID: 19007 (FRONT 1/2) IN 420

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	9.80 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2641	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1454360	NA	9.80	NA
1627	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	555952	1.57	NA	65.5
1716	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	468960	1.95	NA	77.9
2288	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	293485	1.89	NA	76.3
2918	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	730264	7.07	NA	72.1
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	NA		NA	NA
2553	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	2.784 *	145825		0.703	2.84
3157	13C-OCDF	454/456 (87/100)	454+456	1.946	140576		0.969	4.04
1691	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	251520		0.539	2.29
2668	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	206110		0.814	3.32
3150	13C-OCDD	470/472 (87/100)	470+472	1.702	137336		1.08	4.42

* = THE RRF WAS CALCULATED USING THE 386 ION ONLY AND NOT THE 386 + 388 ION.

GC/MS ANALYST: RICK R. ANALYSIS DATE: 3/3/88 DATA ENTRY REVIEWED: NB DATE: 4/12/88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/9/88 REVIEWED: Mike Molloy DATE: 3/9/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/9/88 REVIEWED: ____________ DATE: ________

F19007XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C03X3
SAMPLE ID: 19007 (FRONT 1/2) IN 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	9.8 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA	AMOUNT IN SAMPLE (NG)
1630	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	1450872	2.41
1719	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	37470	0.0844
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	12013582	20.0
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	3719355	7.13
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	1365843	3.45
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	406161	1.41
3158	OCTA-CDF	442/444 (87/100)	442+444	2.121	45909	0.291
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	1608611	3.62
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	1257288	3.64
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	1376605	5.23
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	837502	3.70
3154	OCTA-CDD	458/460 (87/100)	458+460	1.978	364682	2.47

GC/MS ANALYST: R. ROBSON ANALYSIS DATE: 3/3/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/19/88
DATA ENTRY: P. PERKINS ENTRY DATE: 5/20/88

REVIEWED:__________ DATE:______
REVIEWED: Mike Molloy DATE: 5/19/88
REVIEWED: DATE: 3/15/88

B19008XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C23X7
SAMPLE ID: 19008 (BACK 1/2) IN 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	39.2 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2667	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	732304	NA	39.2	NA
1624	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	402196	9.03	NA	376.2 *
1712	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	345562	11.41	NA	456.2 *
2305	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	183384	9.37	NA	378.5 *
2946	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	391828	30.12	NA	307.4 *
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	18673	ND <	0.0789	0.322
2577	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	379292		4.98	20.1 *
3184	13C-OCDF	454/456 (87/100)	454+456	1.946	155131		1.99	8.31 *
1686	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	1476432		4.29	18.3 *
2695	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	473310		3.49	14.2 *
3177	13C-OCDD	470/472 (87/100)	470+472	1.702	109903		1.61	6.59 *

* = SEE FILE B19008DL FOR QUANTITATION OF SAMPLE DILUTION.

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/23/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/24/88
DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/24/88

DATA ENTRY REVIEWED: AJ Harrison DATE: 4-18 88
REVIEWED: Mike Molloy DATE: 3/24/88
REVIEWED: ________ DATE: ________

919008XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 898SL09
GC/MS DATA FILE: 898SC23X7
SAMPLE ID: 19008 (BACK 1/2) IN 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	39.2 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA	AMOUNT IN SAMPLE (NG)
1627	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	1904106	4.15
1714	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	36061	0.110
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	18357073	42.2
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	4346644	13.3
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	1187812	5.59
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	238704	1.54
3164	OCTA-CDF	442/444 (87/100)	442+444	2.121	6397	0.0754
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	1080595	3.30
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	466194	2.16
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	203922	1.44
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	131007	1.08
3178	OCTA-CDD	458/460 (87/100)	458+460	1.978	29933	0.378

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/23/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/18/88
DATA ENTRY: P. PERKINS ENTRY DATE: 5/18/88

REVIEWED:__________ DATE:______
REVIEWED: Mike Molloy DATE: 5/18/88
REVIEWED: J Coats DATE: 3/15/89

B190080L

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C24X6
SAMPLE ID: 19008 (BACK 1/2) IN 420 (DILUTION)

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	39.2 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2659	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	467740	NA	39.2	NA
1625	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	50616	1.78	NA	74.1
1711	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	43544	2.25	NA	90.0
2299	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	25037	2.00	NA	80.9
2938	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	61028	7.35	NA	75.0
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	4375	ND <	0.135	0.553
2570	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	119432		3.90	15.8
3174	13C-OCDF	454/456 (87/100)	454+456	1.946	25158		2.08	8.65
1686	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	217241		5.01	21.3
2687	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	70202		3.32	13.5
3166	13C-OCDD	470/472 (87/100)	470+472	1.702	14765		1.39	5.68

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/24/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 4/3/88
DATA ENTRY: MIKE MOLLOY ENTRY DATE: 4/3/88

DATA ENTRY REVIEWED: PgHarrison DATE: 4-18-88
REVIEWED: Mike Molloy DATE: 4/3/88
REVIEWED: ____________ DATE: ________

B190080L

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 9985C24X6
SAMPLE ID: 19008 (BACK 1/2) IN 420 (DILUTION)

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	39.2 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
1627	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	273732		5.00
NA	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	9605	ND<	0.233
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	2746744		50.2
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	562260		12.6
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	99405		3.00
2952	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	14821		0.614
NA	OCTA-CDF	442/444 (87/100)	442+444	2.121	5552	ND<	0.405
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	99814		2.42
2073	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	14901		0.506
2599	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	7717		0.351
2980	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	10842		0.573
3167	OCTA-CDD	458/460 (87/100)	458+460	1.978	7399		0.601

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/24/88 REVIEWED: ____________ DATE: ________

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/19/88 REVIEWED: Mike Molloy DATE: 5/19/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/19/88 REVIEWED: J Coates DATE: 3/15/89

XI9009XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C21X7
SAMPLE ID: 19009 (XAD) IN 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	39.2 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2659	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1680650	NA	39.2	NA
1626	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	201408	1.97	NA	82.1
1716	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	179632	2.58	NA	103
2302	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	101276	2.25	NA	91.1
2933	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	202254	6.78	NA	69.1
2160	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	2518110		19.3	78.6
2571	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	156695		1.54	6.24
3169	13C-OCDF	454/456 (87/100)	454+456	1.946	51381		1.28	5.33
1688	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	305607		1.71	7.28
2688	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	118764		1.69	6.91
3162	13C-OCDD	470/472 (87/100)	470+472	1.702	29475		0.839	3.42

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/21/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/22/88
DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/22/88

DATA ENTRY REVIEWED: PJHarrison DATE: 4-18-88
REVIEWED: Mike Molloy DATE: 3/22/88
REVIEWED: ____________ DATE: ____________

VSU

X19009XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C21X7
SAMPLE ID: 19009 (XAD) IN 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	39.2 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
1628	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	332508		1.53
1715	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	6768		0.0398
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	3379909		15.5
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	633297		3.52
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	137161		1.25
2850	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	22571		0.282
NA	OCTA-CDF	442/444 (87/100)	442+444	2.121	6362	ND<	0.145
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	121042		0.712
2078	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	24757		0.208
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	13315		0.183
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	8469		0.135
3162	OCTA-CDD	458/460 (87/100)	458+460	1.978	14119		0.346

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/21/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/20/88
DATA ENTRY: P. PERKINS ENTRY DATE: 5/20/88

REVIEWED:________________ DATE:________
REVIEWED: Mike Molloy DATE: 5/20/88
REVIEWED: J Coates DATE: 3/15/89

C19015XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C03X4
SAMPLE ID: 19015-16 (CYCLONE/FILTER) IN 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	9.80 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2640	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1311560	NA	9.80	NA
1622	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	590184	1.85	NA	77.1
1710	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	400096	1.84	NA	73.7
2285	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.049	281876	2.01	NA	81.2
2917	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	711620	7.64	NA	77.9
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	NA		NA	NA
2551	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	2.784 *	1763670		8.72	35.2
3157	13C-OCDF	454/456 (87/100)	454+456	1.946	1722384		12.2	50.8
1687	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.497	2913540		7.32	31.1
2667	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	2133890		8.64	35.3
3150	13C-OCDD	470/472 (87/100)	470+472	1.702	1728744		14.0	57.1

* = THE RRF WAS CALCULATED USING THE 386 ION ONLY AND NOT THE 386 + 388 ION.

GC/MS ANALYST: RICK R. ANALYSIS DATE: 3/3/88 DATA ENTRY REVIEWED: ______ DATE: 4/12/88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/9/88 REVIEWED: Mike Molloy DATE: 3/9/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/9/88 REVIEWED: ______ DATE: ______

C19015XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C03X4
SAMPLE ID: 19015-16 (CYCLONE/FILTER) IN 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	9.8 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.60 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA	AMOUNT IN SAMPLE (NG)
1626	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	9543280	15.0
1715	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	93440	0.247
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	86481107	136
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	27498417	54.9
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	10131068	26.3
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.975	3189052	11.3
3158	OCTA-CDF	442/444 (87/100)	442+444	2.121	468744	3.04
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	99769469	263
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	34229884	103
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	18431146	71.8
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	8830968	40.1
3150	OCTA-CDD	458/460 (87/100)	458+460	1.978	3780030	26.3

GC/MS ANALYST:	R. ROBSON	ANALYSIS DATE:	3/3/88	REVIEWED: ____________	DATE: ________
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	5/19/88	REVIEWED: Mike Molloy	DATE: 5/19/88
DATA ENTRY:	P. PERKINS	ENTRY DATE:	5/20/88	REVIEWED:	DATE: 3/15/89

F19017XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C03XS
SAMPLE ID: 19017 (FRONT 1/2) IN 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD 9.80 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2638	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1300940	NA	9.80	NA
1625	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	555104	1.75	NA	73.1
1714	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	403466	1.87	NA	75.0
2284	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	247392	1.78	NA	71.9
2915	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	651682	7.05	NA	71.9
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	NA		NA	NA
2550	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	2.784 *	139080		0.751	3.04
3155	13C-OCDF	454/456 (87/100)	454+456	1.946	120598		0.932	3.88
1669	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	301186		0.750	3.19
2665	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	185560		0.821	3.35
3146	13C-OCDD	470/472 (87/100)	470+472	1.702	119480		1.06	4.31

* = THE RRF WAS CALCULATED USING THE 386 ION ONLY AND NOT THE 386 + 388 ION.

GC/MS ANALYST: RICK R. ANALYSIS DATE: 3/3/88 DATA ENTRY REVIEWED: PJHarrism DATE: 4-18-88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/9/88 REVIEWED: Mike Molloy DATE: 3/9/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/9/88 REVIEWED: ________ DATE: ________

F19017XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C03X5
SAMPLE ID: 19017 (FRONT 1/2) IN 420

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	9.8 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA	AMOUNT IN SAMPLE (NG)
1629	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	901304	1.50
1717	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	18492	0.0484
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	7944207	13.2
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	2423054	5.51
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	779629	2.21
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	215730	0.837
3155	OCTA-CDF	442/444 (87/100)	442+444	2.121	17034	0.121
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	937468	2.45
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	694413	2.38
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	781218	3.32
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	438743	2.17
3146	OCTA-CDD	458/460 (87/100)	458+460	1.979	207220	1.58

GC/MS ANALYST: R. ROBSON ANALYSIS DATE: 3/3/88 REVIEWED:________________ DATE:________

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/19/88 REVIEWED: Mike Molloy DATE: 5/19/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/23/88 REVIEWED:________________ DATE: 3/15/89

B19018XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C23X8
SAMPLE ID: 19018 (BACK 1/2) IN 420

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	39.2 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.49 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2671	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	569528	NA	39.2	NA
1632	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	442256	12.77	NA	531.9 *
1720	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	326224	13.84	NA	553.8 *
2311	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	161043	10.58	NA	427.4 *
2949	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	226780	22.42	NA	228.8 *
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	6947	ND<	0.03	0.136
2582	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	1722968		15.15	61.2 *
3189	13C-OCDF	454/456 (87/100)	454+456	1.946	93631		2.08	8.66 *
1694	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	4464470		13.76	58.5 *
2699	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	618112		7.96	32.1 *
3180	13C-OCDD	470/472 (87/100)	470+472	1.702	65060		1.65	6.74 *

* = SEE FILE B19018DL FOR QUANTITATION OF SAMPLE DILUTION.

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/23/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/24/88
DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/24/88

DATA ENTRY REVIEWED: PJHarrison DATE: 4-18 88
REVIEWED: Mike Molloy DATE: 3/24/88
REVIEWED: ____________ DATE: ____________

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C23X8
SAMPLE ID: 19018 (BACK 1/2) IN 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	39.2 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
1635	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	1205096		2.52
NA	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	15534	ND<	0.0503
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	11956823		25.02
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	2419886		8.46
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	386858		3.15
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	46469		0.518
NA	OCTA-CDF	442/444 (87/100)	442+444	2.121	3121	ND<	0.0636
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	560998		1.82
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	157170		0.829
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	43236		0.529
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	20294		0.289
NA	OCTA-CDD	458/460 (87/100)	458+460	1.978	5374	ND<	0.117

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/23/88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/18/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/18/88

REVIEWED: ______________ DATE: ________

REVIEWED: Mike Molloy DATE: 5/18/88

REVIEWED: ______________ DATE: 3/15/89

8190180L

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C24M5
SAMPLE ID: 19018 (BACK 1/2) IN 420 (DILUTION)

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	39.2 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3.7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2661	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	544048	NA	39.2	NA
1625	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	71602	2.16	NA	90.2
1713	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	NA	*	NA	
2300	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	36813	2.53	NA	102
2940	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	99324	10.28	NA	105
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	4124	ND <	0.0868	0.354
2572	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	503002		10.1	40.8
3177	13C-OCDF	454/456 (87/100)	454+456	1.946	75291		3.82	15.9
1687	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	NA *			
2689	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	203915		5.92	24.2
3168	13C-OCDD	470/472 (87/100)	470+472	1.702	49321		2.86	11.7

* = UNABLE TO RESOLVE H~ INTERFERING PEAK. SEE FILE ~~[illegible]~~ ~~[illegible]~~ 8190180 H— 4/3/88 FOR QUANTITATION.

GC/MS ANALYST:	DAVE MILLS	ANALYSIS DATE:	3/24/88	DATA ENTRY REVIEWED: fjHarrison	DATE: 4-18-88
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	4/3/88	REVIEWED: Mike Molloy	DATE: 4/3/88
DATA ENTRY:	MIKE MOLLOY	ENTRY DATE:	4/3/88	REVIEWED:	DATE:

B19018TD

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C24XS
SAMPLE ID: 19018 (BACK 1/2) IN 420 (DILUTION)

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	39.2 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (PEAK HEIGHT(S)/PEAK HEIGHT(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (PEAK HEIGHT(S)/PEAK HEIGHT(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	PEAK HEIGHT	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2661	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	85120	NA	39.2	NA
1713	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.429	10246	3.30	NA	132
1687	13C-1,2,3,4-TCDD	332/334 (76/100)	332	1.279	64832		12.37	52.6

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/24/88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 4/3/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 4/3/88

DATA ENTRY REVIEWED: ____________ DATE: ____________

REVIEWED: Mike Molloy DATE: 4/13/88

REVIEWED: J Bates DATE: 3/15/89

8190180L

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C24XS
SAMPLE ID: 19018 (BACK 1/2) IN 420 (DILUTION)

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	39.2 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
1629	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	229178		2.96
NA	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	NA *		
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306-	2.594	2386878		30.8
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	395386		6.047
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	62540		1.16
2856	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	10794		0.275
NA	OCTA-CDF	442/444 (87/100)	442+444	2.121	2096	NOK	0.0975
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	NA *		
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	11145	NOK	0.257
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	12318	NOK	0.344
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	2367	NOK	0.0769
NA	OCTA-CDD	458/460 (87/100)	458+460	1.978	5273		0.263

* = UNABLE TO RESOLVE C13-2,3,7,8-TCDD DUE TO INTERFERING PEAK. SEE FILE 8190181D FOR QUANTITATION.

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/24/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/19/88
DATA ENTRY: P. PERKINS ENTRY DATE: 5/19/88

REVIEWED: ________ DATE: ________
REVIEWED: Mike Molloy DATE: 5/19/88
REVIEWED: DATE: 3/15/89

81901870

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C24X5
SAMPLE ID: 19018 (BACK 1/2) IN 420 (DILUTION)

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	39.2 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (PEAK HEIGHT(S)/PEAK HEIGHT(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL PK HT		AMOUNT IN SAMPLE (NG)
NA	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.468	6089	ND<	0.502
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.468	10107		0.399

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/24/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/24/88
DATA ENTRY: MIKE MOLLOY ENTRY DATE: 5/24/88

REVIEWED:________ DATE:______
REVIEWED: Mike Molloy DATE: 5/24/88
REVIEWED: J Coates DATE: 3/15/89

X19019XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C21X8
SAMPLE ID: 19019 (XAD) IN 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	39.2 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.40 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.9 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2663	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1754750	NA	39.2	NA
1631	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	171288	1.60	NA	66.9
1718	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	133744	1.84	NA	73.7
2306	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	92207	1.97	NA	79.4
2936	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	205384	6.59	NA	67.2
2163	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	2377384		20.0	81.5
2576	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	31006		0.301	1.22
NA	13C-OCDF	454/456 (87/100)	454+456	1.346	6024	ND <	0.148	0.615
1694	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	97002		0.729	3.10
2691	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	47263		0.663	2.71
NA	13C-OCDD	470/472 (87/100)	470+472	1.702	4315	ND <	0.121	0.494

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/21/88 DATA ENTRY REVIEWED: BHarrison DATE: 4-13-88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/23/88 REVIEWED: Mike Molloy DATE: 3/23/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/23/88 REVIEWED: DATE:

X19019XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C21X8
SAMPLE ID: 19019 (XAD) IN 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	39.2 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
1634	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	51440		0.278
NA	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	8684	NDK	0.0686
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	542424		2.93
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	34866		0.213
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	4960	NDK	0.0445
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	4328	NDK	0.0533
NA	OCTA-CDF	442/444 (87/100)	442+444	2.121	2998	NDK	0.0675
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	12737	NDK	0.101
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	7872	NDK	0.0725
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	4667	NDK	0.0630
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	2712	NDK	0.0426
3166	OCTA-CDD	458/460 (87/100)	458+460	1.978	7613		0.184

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/21/88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/20/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/23/88

REVIEWED:__________ DATE:______

REVIEWED: Mike Molloy DATE: 5/20/88

REVIEWED: DATE: 3/15/89

F19026XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C03X6
SAMPLE ID: 19026 (FILTER) OUT 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	9.80 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2655	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1431870	NA	9.80	NA
1616	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	569952	1.64	NA	68.2
1704	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	371984	1.57	NA	62.8
2279	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	263650	1.72	NA	69.6
2912	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	732508	7.20	NA	73.5
2546	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	NA		NA	NA
2546	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	2.784 *	55523		0.257	1.08
3153	13C-OCDF	454/456 (87/100)	454+456	1.946	58709		0.404	1.68
1681	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	107941		0.292	1.24
2663	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	109095		0.429	1.75
3145	13C-OCDD	470/472 (87/100)	470+472	1.702	66503		0.523	2.13

* = THE RRF WAS CALCULATED USING THE 386 ION ONLY AND NOT THE 386 + 388 ION.

GC/MS ANALYST: RICK R. ANALYSIS DATE: 3/3/88 DATA ENTRY REVIEWED: PJHarrison DATE: 4-18-88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/9/88 REVIEWED: Mike Molloy DATE: 3/9/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/9/88 REVIEWED: ____________ DATE: ________

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C03X6
SAMPLE ID: 19026 (FILTER) OUT 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	9.8 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
1619	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	636068		1.03
NA	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	15893	ND<	0.0451
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	4969970		8.068
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	1662952		3.55
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	715357		1.80
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	248265		0.857
3153	OCTA-CDF	442/444 (87/100)	442+444	2.121	32668		0.206
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	734786		2.09
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	705776		2.27
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	1026181		3.88
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	651875		2.87
NA	OCTA-CDD	458/460 (87/100)	458+460	1.978	316402		2.14

GC/MS ANALYST: R. ROBSON   ANALYSIS DATE: 3/3/88
DATA ANALYST: MIKE MOLLOY   ANALYSIS DATE: 5/18/88
DATA ENTRY: P. PERKINS   ENTRY DATE: 5/18/88

REVIEWED:__________ DATE:______
REVIEWED: Mike Molloy DATE: 5/18/88
REVIEWED: J Coats DATE: 3/15/89

F19027XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C04X1
SAMPLE ID: 19027 (FRONT 1/2) OUT 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD 9.80 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2650	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1741230	NA	9.80	NA
1624	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	757256	1.79	NA	74.5
1713	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	525936	1.83	NA	73.0
2295	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	362752	1.95	NA	78.7
2923	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	910256	7.36	NA	75.1
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	NA		NA	NA
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	5016	ND<	0.0110	0.0444
NA	13C-OCDF	454/456 (87/100)	454+456	1.946	8045	ND<	0.0445	0.185
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	57964	ND<	0.111	0.471
2677	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	56892		0.180	0.735
NA	13C-OCDD	470/472 (87/100)	470+472	1.702	2631	ND<	0.0166	0.0679

GC/MS ANALYST:	KELLY T.	ANALYSIS DATE:	3/4/88	DATA ENTRY REVIEWED:	PJHarrison	DATE:	4-18-88
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	3/15/88	REVIEWED:	Mike Molloy	DATE:	3/15/88
DATA ENTRY:	MIKE MOLLOY	ENTRY DATE:	3/15/88	REVIEWED:		DATE:	

F19027XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C04X1
SAMPLE ID: 19027 (FRONT 1/2) OUT 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD 9.8 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
1626	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	130974		0.160
NA	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	11836	ND<	0.0238
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	1181679		1.44
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	367138		0.570
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	112363		0.228
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	36333		0.101
NA	OCTA-CDF	442/444 (87/100)	442+444	2.121	2235	ND<	0.0113
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	139852		0.281
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	107230		0.251
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	201832		0.615
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	144716		0.513
3155	OCTA-CDD	458/460 (87/100)	458+460	1.978	87729		0.477

GC/MS ANALYST: K. THORNBURG ANALYSIS DATE: 3/4/88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/18/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/19/88

REVIEWED:__________ DATE:______

REVIEWED: Mike Molloy DATE: 5/18/88

REVIEWED: JBates DATE: 3/15/89

B19028XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C23X1
SAMPLE ID: 19028 (BACK 1/2) OUT 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	49.0 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.40 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2667	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	3346170	NA	49.0	NA
1626	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	226392	1.39	NA	57.9
1716	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	154201	1.39	NA	55.7
2304	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	146389	2.05	NA	82.7
2946	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	329512	6.93	NA	70.7
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	12049	ND<	0.0638	0.260
2577	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	2571080		15.6	62.9 *
3184	13C-OCDF	454/456 (87/100)	454+456	1.946	1757232		26.9	112 *
1689	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	2290210		14.9	63.5 *
2695	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	1810968		15.8	64.7 *
3177	13C-OCDD	470/472 (87/100)	470+472	1.702	1609844		28.1	115 *

* = SEE FILE B19028DL FOR QUANTITATION OF SAMPLE DILUTION.

GC/MS ANALYST: KELLY T. ANALYSIS DATE: 3/23/88
DATA ENTRY REVIEWED: Harrison DATE: 4-15-88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/24/88
REVIEWED: Mike Molloy DATE: 3/24/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/24/88
REVIEWED: DATE:

B19028XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 898SL09
GC/MS DATA FILE: 898SC23X1
SAMPLE ID: 19028 (BACK 1/2) OUT 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD 49 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA	AMOUNT IN SAMPLE (NG)
1629	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	857790	3.51
1716	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	27716	0.190
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	7354985	30.06
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	2608131	10.03
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	1121061	6.28
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.975	486607	3.74
3184	OCTA-CDF	442/444 (87/100)	442+444	2.121	91656	1.29
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	569976	3.90
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	340357	1.98
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	253736	2.13
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	393910	3.86
NA	OCTA-CDD	458/460 (87/100)	460	1.055	137056	3.86

GC/MS ANALYST: K. THORNBURG ANALYSIS DATE: 3/23/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/19/88
DATA ENTRY: P. PERKINS ENTRY DATE: 5/20/88

REVIEWED:__________ DATE:______
REVIEWED: Mike Molloy DATE: 5/19/88
REVIEWED: DATE: 3/15/89

B19028DL

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C24X4
SAMPLE ID: 19028 (BACK 1/2) OUT 420 (DILUTION)

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	49.8 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2562	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	668192	NA	49.0	NA
1626	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	46503	1.43	NA	59.6
1714	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	34844	1.58	NA	63.0
2301	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	30046	2.10	NA	85.0
2939	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	55799	5.88	NA	60.0
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	4856	ND <	0.125	0.511
2572	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	559066		20.0	80.7
3175	13C-OCDF	454/456 (87/100)	454+456	1.946	294288		26.6	111
1688	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	576152		16.6	70.7
2690	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	362828		18.7	76.5
3169	13C-OCDD	470/472 (87/100)	470+472	1.702	251535		26.0	106

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/24/88 DATA ENTRY REVIEWED: PJHarrison DATE: 4-18-88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 4/3/88 REVIEWED: Mike Molloy DATE: 4/3/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 4/3/88 REVIEWED:________ DATE:________

81902BDL

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 898SL09
GC/MS DATA FILE: 898SC24X4
SAMPLE ID: 19028 (BACK 1/2) OUT 420 (DILUTION)

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	49 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
1630	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	204125		4.06
NA	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	13466	ND<	0.408
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	1814162		36.1
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	508975		9.54
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	142674		4.72
2956	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	52140		2.36
NA	OCTA-CDF	442/444 (87/100)	442+444	2.121	4331	ND<	0.359
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	86448		2.62
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	31528		0.891
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	15568		0.774
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	41493		2.40
NA	OCTA-CDD	458/460 (87/100)	458+460	1.979	46246		4.11

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/24/88 REVIEWED:________ DATE:______

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/19/88 REVIEWED: Mike Molloy DATE: 5/19/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/19/88 REVIEWED:________ DATE: 3/15/89

X19029XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985CZ3X4
SAMPLE ID: 19029 (XAD) OUT 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2663	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1997590	NA	19.6	NA
1631	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	603344	2.48	NA	103
1718	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	396960	2.40	NA	96.1
2308	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	278272	2.61	NA	105
2947	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	836816	11.79	NA	120
2164	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	8575630		23.9	97.5
2580	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	2266662		5.40	21.8
3186	13C-OCDF	454/456 (87/100)	454+456	1.946	1348192		8.11	33.8
1694	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	2241302		5.68	24.2
2697	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	1597560		5.50	22.5
3178	13C-OCDD	470/472 (87/100)	470+472	1.702	1193616		8.21	33.5

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/23/88 DATA ENTRY REVIEWED: PJHarrison DATE: 4-18-88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/24/88 REVIEWED: Mike Molloy DATE: 3/24/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/24/88 REVIEWED:________ DATE:________

X19029XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C23X4
SAMPLE ID: 19029 (XAD) OUT 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA	AMOUNT IN SAMPLE (NG)
1634	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	1039128	1.59
1722	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	14506	0.0386
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	7420041	11.4
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	2977726	6.024
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	1337215	2.95
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	597207	1.81
3186	OCTA-CDF	442/444 (87/100)	442+444	2.121	90504	0.500
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	1015455	2.70
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	531517	1.62
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	353430	1.17
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	484771	1.87
3179	OCTA-CDD	458/460 (87/100)	458+460	1.055	222352	2.47

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/23/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/19/88
DATA ENTRY: P. PERKINS ENTRY DATE: 5/20/88

REVIEWED: ______________ DATE: ________
REVIEWED: Mike Molloy DATE: 5/19/88
REVIEWED: ______________ DATE: 3/16/89

F19036XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L03
GC/MS DATA FILE: 898SC04N2
SAMPLE ID: 19036 (FILTER) OUT 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	9.80 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.9 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2650	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1523630	NA	9.80	NA
1625	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	672704	1.81	NA	75.6
1712	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	457536	1.81	NA	72.6
2295	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	333216	2.05	NA	82.6
2923	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	886984	8.19	NA	83.6
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	NA		0.00	0.000
2562	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	2.784 *	163580		0.649	2.62
3162	13C-OCDF	454/456 (87/100)	454+456	1.946	187802		1.07	4.44
1690	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	301097		0.662	2.81
2677	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	238754		0.776	3.17
3154	13C-OCDD	470/472 (87/100)	470+472	1.702	222206		1.44	5.89

* = THE RRF WAS CALCULATED USING THE 386 ION ONLY AND NOT THE 386 + 388 ION.

GC/MS ANALYST: KELLY T. ANALYSIS DATE: 3/4/88 DATA ENTRY REVIEWED: PjHarrison DATE: 4-18-88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/15/88 REVIEWED: Mike Molloy DATE: 3/15/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/15/88 REVIEWED: ____________ DATE: __________

F19036XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C04X2
SAMPLE ID: 19036 (FILTER) OUT 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	9.8 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.49 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA	AMOUNT IN SAMPLE (NG)
1629	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	219110	0.301
1714	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	5203	0.0120
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	1716276	2.36
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	633878	1.071
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	229830	0.478
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	95549	0.272
3161	OCTA-CDF	442/444 (87/100)	442+444	2.121	13276	0.0692
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	288628	0.666
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	459076	1.17
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	923149	2.89
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	703262	2.56
3155	OCTA-CDD	458/460 (87/100)	458+460	1.978	374068	2.089

GC/MS ANALYST:	K. THORNBURG	ANALYSIS DATE:	3/4/88
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	5/17/88
DATA ENTRY:	P. PERKINS	ENTRY DATE:	5/18/88

REVIEWED:__________ DATE:______
REVIEWED: Mike Molloy DATE: 5/17/88
REVIEWED: DATE: 3/15/89

F19037XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 898SC04X3
SAMPLE ID: 19037 (FRONT 1/2) OUT 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	9.80 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2649	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1425750	NA	9.80	NA
1625	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	604928	1.74	NA	72.7
1712	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	394498	1.67	NA	66.9
2294	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	262024	1.72	NA	69.4
2921	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	751858	7.42	NA	75.7
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	NA		NA	NA
2561	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	2.784 *	40391		0.189	0.764
3162	13C-OCDF	454/456 (87/100)	454+456	1.946	NA **			
1689	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	93394		0.238	1.01
2675	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	88075		0.338	1.38
3153	13C-OCDD	470/472 (87/100)	470+472	1.702	39418		0.30	1.23

* = THE RRF WAS CALCULATED USING THE 386 ION ONLY AND NOT THE 386 + 388 ION. ** = SEE FILE F19037X0 FOR QUANTITATION.

GC/MS ANALYST: KELLY T. ANALYSIS DATE: 3/4/88 DATA ENTRY REVIEWED: A.Harrison DATE: 4-18-88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/15/88 REVIEWED: Mike Molloy DATE: 3/15/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/15/88 REVIEWED: ________ DATE: ________

F19037XO

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 898SC04X3
SAMPLE ID: 19037 (FRONT 1/2) OUT 420

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	9.80 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (PEAK HEIGHT(S)/PEAK HEIGHT(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (PEAK HEIGHT(S)/PEAK HEIGHT(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	PEAK HEIGHT	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2649	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	235008	NA	9.80	NA
2921	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.738	131831	7.45	NA	76.0
3162	13C-OCDF	454/456 (87/100)	454	0.899	2888 **		0.239	0.995

GC/MS ANALYST: KELLY T.	ANALYSIS DATE: 3/4/88	DATA ENTRY REVIEWED:	B Harrison	DATE:	4-18 88
DATA ANALYST: MIKE MOLLOY	ANALYSIS DATE: 3/31/88	REVIEWED:	Mike Molloy	DATE:	3/31/88
DATA ENTRY: MIKE MOLLOY	ENTRY DATE: 3/31/88	REVIEWED:		DATE:	

F19037XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 898SC04X3
SAMPLE ID: 19037 (FRONT 1/2) OUT 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD 9.8 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
1627	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	44265		0.0677
NA	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	13179		0.0353
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	322475		0.493
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	42064		0.0904
2560	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	7926		0.0194
2840	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	9851		0.0331
NA	OCTA-CDF	442/444 (87/100)	442+444	2.121	2714	ND<	0.0167
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	28860		0.0773
2070	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.314	22437		0.0727
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	49341		0.182
2964	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	14033		0.0602
3153	OCTA-CDD	458/460 (87/100)	460	1.055	12579		0.155

GC/MS ANALYST: K. THORNBURG ANALYSIS DATE: 3/4/88 REVIEWED:__________ DATE:________

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/17/88 REVIEWED: Mike Molloy DATE: 5/17/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/18/88 REVIEWED: JBates DATE: 3/15/89

B19038XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C23X2
SAMPLE ID: 19038 (BACK 1/2) OUT 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	49.0 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2569	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	2708220	NA	49.0	NA
1629	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	233676	1.77	NA	73.9
1717	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	162336	1.81	NA	72.4
2306	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	147906	2.55	NA	103
2947	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	307124	7.98	NA	81.4
2162	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	18499		0.0969	0.396
2579	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	1904126		12.4	49.9
3186	13C-OCDF	454/456 (87/100)	454+456	1.946	1221848		20.0	83.5
1691	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	1728092		10.7	45.5
2697	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	1328664		12.5	50.9
3178	13C-OCDD	470/472 (87/100)	470+472	1.702	1119192		21.0	85.6

GC/MS ANALYST: GENE O. ANALYSIS DATE: 3/23/88 DATA ENTRY REVIEWED: Patterson DATE: 4-18-88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 4/1/88 REVIEWED: Mike Molloy DATE: 4/1/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 4/1/88 REVIEWED:________ DATE:________

B19038XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C23X2
SAMPLE ID: 19038 (BACK 1/2) OUT 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	49 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA	AMOUNT IN SAMPLE (NG)
1632	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	689704	2.73
1722	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	19251	0.125
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	5640726	22.3
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	1786962	6.80
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	838386	5.036
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	417034	3.43
3186	OCTA-CDF	442/444 (87/100)	442+444	2.121	50608	0.761
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	314762	2.047
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	185134	1.063
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	196983	1.78
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	307455	3.23
NA	OCTA-CDD	458/460 (87/100)	460	1.055	89832	2.72

GC/MS ANALYST:	GENE O.	ANALYSIS DATE:	3/23/88	REVIEWED:	DATE:
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	5/19/88	REVIEWED: Mike Molloy	DATE: 5/19/88
DATA ENTRY:	P. PERKINS	ENTRY DATE:	5/20/88	REVIEWED: J Bates	DATE: 3/16/89

X19039XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C23XS
SAMPLE ID: 19039 (XAD) OUT 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD 19.6 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2667	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1314170	NA	19.6	NA
1628	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	734784	4.60	NA	191 *
1716	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	548540	5.04	NA	202 *
2306	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	344016	4.90	NA	198 *
2945	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	1143470	24.49	NA	250 *
2162	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	10536430		23.7	96.9
2577	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	3383940		5.90	23.8 *
3182	13C-OCDF	454/456 (87/100)	454+456	1.946	1920908		8.46	35.2 *
1691	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	2995040		5.49	23.4 *
2694	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	2285899		5.76	23.5 *
3176	13C-OCDD	470/472 (87/100)	470+472	1.702	1778026		8.95	36.5 *

* = SEE FILE X19039DL FOR QUANTITATION OF SAMPLE DILUTION.

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/23/88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/24/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/24/88

DATA ENTRY REVIEWED: PJHarrison DATE: 4-18-88

REVIEWED: Mike Molloy DATE: 3/24/88

REVIEWED:__________ DATE:__________

X19039XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 898SL09
GC/MS DATA FILE: 898SC23XS
SAMPLE ID: 19039 (XAD) OUT 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD 19.6 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA	AMOUNT IN SAMPLE (NG)
1631	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	1210992	1.52
1717	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	18733	0.0361
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	8315819	10.5
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	3949795	6.46
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	1997269	3.22
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	980188	2.17
3184	OCTA-CDF	442/444 (87/100)	442+444	2.121	128450	0.519
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	542493	1.04
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	441920	1.09
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	494634	1.20
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	729948	2.06
3177	OCTA-CDD	458/460 (87/100)	460	1.055	263676	2.14

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/23/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/19/88
DATA ENTRY: P. PERKINS ENTRY DATE: 5/23/88

REVIEWED:__________ DATE:______
REVIEWED: Mike Molloy DATE: 5/19/88
REVIEWED: J Coates DATE: 3/16/89

X190390L

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C24X3
SAMPLE ID: 19039 (XAD) OUT 420 (DILUTION)

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD 19.6 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2661	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	777600	NA	19.6	NA
1626	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	178722	1.89	NA	78.7
1713	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	153368	2.38	NA	95.3
2300	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	82390	1.98	NA	80.1
2939	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	236294	8.55	NA	87.3
2158	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	2407208		22.6	92.4
2571	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	816676		6.89	27.8
3176	13C-OCDF	454/456 (87/100)	454+456	1.946	366314		7.81	32.5
1688	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	842098		5.52	23.5
2688	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	542748		6.62	27.0
3168	13C-OCDD	470/472 (87/100)	470+472	1.702	322312		7.85	32.0

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/24/88 DATA ENTRY REVIEWED: PJHarrison DATE: 4-18-83

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 4/2/88 REVIEWED: Mike Molloy DATE: 4/2/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 4/2/88 REVIEWED:________ DATE:________

X190390L

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C24X3
SAMPLE ID: 19039 (XAD) OUT 420 (DILUTION)

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	24.5 NG
13C-1,2,3,4,7,8-HxCDF	24.8 NG
13C-OCDF	24.0 NG
13C-1,2,3,4-TCDD	23.5 NG
13C-1,2,3,7,8,9-HxCDD	24.5 NG
13C-OCDD	24.5 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
1631	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	312016		1.62
NA	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	14199	ND<	0.098
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	2104618		10.9
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	870374		5.95
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	389177		3.038
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	183934		1.97
3176	OCTA-CDF	442/444 (87/100)	442+444	2.121	14578		0.285
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	62177		0.429
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	24583		0.253
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	60749		0.713
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	126098		1.72
3169	OCTA-CDD	458/460 (87/100)	460	1.055	43370		1.70

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/24/88 REVIEWED:__________ DATE:______

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/19/88 REVIEWED: Mike Molloy DATE: 5/19/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/20/88 REVIEWED: Abate DATE: 3/16/89

F19045XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985B24X7
SAMPLE ID: 19045 (FILTER) BLK TRAIN 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD 9.80 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	NA
13C-1,2,3,4,7,8-HxCDF	NA
13C-OCDF	NA
13C-1,2,3,4-TCDD	NA
13C-1,2,3,7,8,9-HxCDD	NA
13C-OCDD	NA

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/19/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2668	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	2182200	NA	9.80	NA
1630	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.487	932544	1.68	NA	70.2
1718	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.742	639712	1.65	NA	66.0
2307	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	433762	1.86	NA	75.1
2945	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.729	1371070	8.45	NA	86.2
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.348	NA		NA	
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.472	5344	ND<	0.00854	
NA	13C-OCDF	454/456 (87/100)	454+456	2.316	5266	ND<	0.0163	
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.358	86842	ND<	0.144	
2695	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.030	41546		0.0980	
NA	13C-OCDD	470/472 (87/100)	470+472	2.028	3933	ND<	0.0139	

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 2/24/88 DATA ENTRY REVIEWED: PJHarrison DATE: 4-18-88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/14/88 REVIEWED: Mike Molloy DATE: 3/14/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/14/88 REVIEWED:________ DATE:________

F19045XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985B24X7
SAMPLE ID: 19045 (FILTER) BLK TRAIN 420

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	9.80 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	NA
13C-1,2,3,4,7,8-HxCDF	NA
13C-OCDF	NA
13C-1,2,3,4-TCDD	NA
13C-1,2,3,7,8,9-HxCDD	NA
13C-OCDD	NA

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
NA	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	5789	ND<	0.00574
NA	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	6561	ND<	0.0108
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	11579	ND<	0.0115
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	5873	ND<	0.00762
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	4461	ND<	0.00600
2862	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	11468		0.0212
NA	OCTA-CDF	442/444 (87/100)	442+444	2.121	5234	ND<	0.0176
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	6561	ND<	0.0108
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	8050	ND<	0.0158
2585	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	9904		0.0200
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	25312		0.0596
3179	OCTA-CDD	458/460 (87/100)	458+460	1.978	41520		0.150

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 2/24/88 REVIEWED:________ DATE:________

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/12/88 REVIEWED: Mike Molloy DATE: 5/12/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 5/12/88 REVIEWED: J Wates DATE: 3/16/89

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F19046XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985B24X8
SAMPLE ID: 19046 (FRONT 1/2) BLK TRAIN 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD 9.80 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	NA
13C-1,2,3,4,7,8-HxCDF	NA
13C-OCDF	NA
13C-1,2,3,4-TCDD	NA
13C-1,2,3,7,8,9-HxCDD	NA
13C-OCDD	NA

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/19/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2668	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1860700	NA	9.80	NA
1630	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.487	800592	1.70	NA	70.6
1720	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.742	546656	1.65	NA	66.1
2309	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	337656	1.70	NA	68.6
2945	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.729	1030430	7.44	NA	76.0
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.348	NA		NA	
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.472	5660	ND<	0.01204	
NA	13C-OCDF	454/456 (87/100)	454+456	2.316	3557	ND<	0.0146	
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.358	55116	ND<	0.107	
2693	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.030	20131		0.0632	
NA	13C-OCDD	470/472 (87/100)	470+472	2.028	3692	ND<	0.0173	

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 2/24/88 DATA ENTRY REVIEWED: Bharrison DATE: 4-18-88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/14/88 REVIEWED: Mike Molloy DATE: 3/14/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/14/88 REVIEWED:__________ DATE:__________

F19046XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985B24X8
SAMPLE ID: 19046 (FRONT 1/2) BLK TRAIN 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD 9.80 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	NA
13C-1,2,3,4,7,8-HxCDF	NA
13C-OCDF	NA
13C-1,2,3,4-TCDD	NA
13C-1,2,3,7,8,9-HxCDD	NA
13C-OCDD	NA

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
NA	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	4893	ND<	0.00565
NA	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	6913	ND<	0.0134
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	4893	ND<	0.00565
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	6928	ND<	0.0116
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	4090	ND<	0.00732
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	4312	ND<	0.0106
NA	OCTA-CDF	442/444 (87/100)	442+444	2.121	3224	ND<	0.0145
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	6913	ND<	0.0134
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	3682	ND<	0.00926
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	3063	ND<	0.00824
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	4704	ND<	0.0147
NA	OCTA-CDD	458/460 (87/100)	458+460	1.978	10400		0.0500

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 2/24/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/12/88
DATA ENTRY: P. PERKINS ENTRY DATE: 5/13/88

REVIEWED:________ DATE:________
REVIEWED: Mike Molloy DATE: 5/12/88
REVIEWED: DATE: 3/16/89

819047XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985B25X1
SAMPLE ID: 19047 (BACK 1/2) BLK TRAIN 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	9.80 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	NA
13C-1,2,3,4,7,8-HxCDF	NA
13C-OCDF	NA
13C-1,2,3,4-TCDD	NA
13C-1,2,3,7,8,9-HxCDD	NA
13C-OCDD	NA

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/19/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2647	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1208170	NA	9.80	NA
1625	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.487	631848	2.06	NA	85.9
1713	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.742	452752	2.11	NA	84.3
2292	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	259284	2.01	NA	81.1
2923	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.729	561964	6.25	NA	63.8
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.348	12537	ND<	0.0357	
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.472	7508	ND<	0.0293	
NA	13C-OCDF	454/456 (87/100)	454+456	2.316	4746	ND<	0.0357	
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.358	39091	ND<	0.0915	
NA	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.030	7685	ND<	0.0442	
NA	13C-OCDD	470/472 (87/100)	470+472	2.028	22403	ND<	0.193	

GC/MS ANALYST: GENE O. ANALYSIS DATE: 2/25/88 DATA ENTRY REVIEWED: PJHarrison DATE: 4-15-88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/14/88 REVIEWED: Mike Molloy DATE: 3/14/88
DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/14/88 REVIEWED: ____________ DATE: ____________

819047XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985B25X1
SAMPLE ID: 19047 (BACK 1/2) BLK TRAIN 420

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	9.80 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	NA
13C-1,2,3,4,7,8-HxCDF	NA
13C-OCDF	NA
13C-1,2,3,4-TCDD	NA
13C-1,2,3,7,8,9-HxCDD	NA
13C-OCDD	NA

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
1627	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	33364		0.0489
NA	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	30881	ND<	0.0720
1627	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	33364		0.0489
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	8578	ND<	0.0186
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	4789	ND<	0.0157
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	6033	ND<	0.0272
NA	OCTA-CDF	442/444 (87/100)	442+444	2.121	3160	ND<	0.0260
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	30881	ND<	0.0720
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	3993	ND<	0.0131
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	9439	ND<	0.0466
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	5905	ND<	0.0339
3158	OCTA-CDD	458/460 (87/100)	458+460	1.978	7086		0.0625

GC/MS ANALYST: GENE O. ANALYSIS DATE: 2/25/88 REVIEWED:____________ DATE:________

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/13/88 REVIEWED: Mike Molloy DATE: 5/13/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/16/88 REVIEWED: JWhite DATE: 3/16/88

X19048XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985825X2
SAMPLE ID: 19048 (XAD) BLK TRAIN 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	9.80 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.40 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	NA
13C-1,2,3,4,7,8-HxCDF	NA
13C-OCDF	NA
13C-1,2,3,4-TCDD	NA
13C-1,2,3,7,8,9-HxCDD	NA
13C-OCDD	NA

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE-RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/19/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2644	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1544550	NA	9.80	NA
1617	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.487	731128	1.97	NA	77.7
1705	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.742	539066	1.96	NA	78.5
2298	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	330992	2.00	NA	81.0
2920	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.729	693148	6.03	NA	61.6
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.348	14510	ND<	0.0324	
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.472	6297	ND<	0.0199	
NA	13C-OCDF	454/456 (87/100)	454+456	2.316	3488	ND<	0.0213	
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.358	57895	ND<	0.114	
2671	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.030	27047		0.126	
NA	13C-OCDD	470/472 (87/100)	470+472	2.028	2762	ND<	0.0193	

GC/MS ANALYST: GENE O. ANALYSIS DATE: 2/25/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/14/88
DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/14/88

DATA ENTRY REVIEWED: ______________ DATE: 4-15-88
REVIEWED: Mike Molloy DATE: 3/14/88
REVIEWED: ______________ DATE: ______________

X19048XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985B2SX2
SAMPLE ID: 19048 (XAD) BLK TRAIN 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	9.80 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	2.40 NG
13C-2,3,7,8-TCDD	2.50 NG
13C-1,2,3,7,8-PeCDD	2.48 NG
13C-1,2,3,4,6,7,8-HpCDD	9.80 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	NA
13C-1,2,3,4,7,8-HxCDF	NA
13C-OCDF	NA
13C-1,2,3,4-TCDD	NA
13C-1,2,3,7,8,9-HxCDD	NA
13C-OCDD	NA

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
NA	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	15226	ND<	0.0193
NA	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	14723	ND<	0.0288
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	15226	ND<	0.0193
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	9950	ND<	0.0169
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	2808	ND<	0.0075
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	4406	ND<	0.0161
NA	OCTA-CDF	442/444 (87/100)	442+444	2.121	2690	ND<	0.0179
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	14723	ND<	0.0288
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	5345	ND<	0.0137
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	6076	ND<	0.0243
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	3881	ND<	0.0181
3153	OCTA-CDD	458/460 (87/100)	458+460	1.978	3616		0.0258

GC/MS ANALYST: GENE O.   ANALYSIS DATE: 2/25/88
DATA ANALYST: MIKE MOLLOY   ANALYSIS DATE: 5/13/88
DATA ENTRY: P. PERKINS   ENTRY DATE: 5/16/88

REVIEWED:________ DATE:______
REVIEWED: Mike Molloy DATE: 5/17/88
REVIEWED: DATE: 3/16/89

F20006XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C08X1
SAMPLE ID: 20006 (FILTER) IN 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.6 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2645	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1491160	NA	19.6	NA
1617	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	812144	4.48	NA	93.3
1705	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	545840	4.42	NA	88.5
2287	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	322208	4.04	NA	81.7
2921	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	795680	15.02	NA	76.6
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	NA		NA	NA
2557	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	430972		2.16	0.436
3161	13C-OCDF	454/456 (87/100)	454+456	1.946	261340		3.31	0.689
1681	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	327489		1.21	0.257
2672	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	369924		2.68	0.547
3154	13C-OCDD	470/472 (87/100)	470+472	1.702	276460		4.00	0.816

GC/MS ANALYST: KELLY T.   ANALYSIS DATE: 3/8/88   DATA ENTRY REVIEWED: PJHarrism   DATE: 4-18-88

DATA ANALYST: MIKE MOLLOY   ANALYSIS DATE: 3/16/88   REVIEWED: Mike Molloy   DATE: 3/16/88

DATA ENTRY: MIKE MOLLOY   ENTRY DATE: 3/16/88   REVIEWED: ____________   DATE: ____________

F20006XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C08X1
SAMPLE ID: 20006 (FILTER) IN 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.60 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
NA	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	11868	ND<	0.0270
NA	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	15823	ND<	0.0612
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	11868	ND<	0.0270
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	5635	ND<	0.0197
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	6825	ND<	0.0316
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	6930	ND<	0.0441
NA	OCTA-CDF	442/444 (87/100)	442+444	2.121	4326	ND<	0.0502
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	15823	ND<	0.0612
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	7047	ND<	0.0372
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	10984	ND<	0.0765
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	3317	ND<	0.0269
NA	OCTA-CDD	458/460 (87/100)	458+460	1.978	5374	ND<	0.0669

GC/MS ANALYST: K. THORNBURG   ANALYSIS DATE: 3/8/88
DATA ANALYST: MIKE MOLLOY   ANALYSIS DATE: 5/17/88
DATA ENTRY: P. PERKINS   ENTRY DATE: 5/18/88

REVIEWED:____________________ DATE:________
REVIEWED: Mike Molloy DATE: 5/17/88
REVIEWED: J Bates DATE: 3/13/89

F20007XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C08X2
SAMPLE ID: 20007 (FRONT 1/2) IN 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.6 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2645	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1377030	NA	19.6	NA
1617	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	704872	4.21	NA	87.7
1704	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	510456	4.48	NA	89.6
2288	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	303404	4.12	NA	83.3
2922	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	728136	14.89	NA	75.9
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	NA		NA	NA
2556	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	1196140		6.55	1.32
3162	13C-OCDF	454/456 (87/100)	454+456	1.946	641104		8.87	1.85
1680	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	1467760		5.78	1.23
2673	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	728312		5.77	1.18
3154	13C-OCDD	470/472 (87/100)	470+472	1.702	686524		10.9	2.22

GC/MS ANALYST: KELLY T. ANALYSIS DATE: 3/8/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/16/88
DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/16/88

DATA ENTRY REVIEWED: PJHarrison DATE: 4-18-88
REVIEWED: Mike Molloy DATE: 3/16/88
REVIEWED: DATE: 3/16/88

F20007XN

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C08X2
SAMPLE ID: 20007 (FRONT 1/2) IN 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.90 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.60 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
NA	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	8615	ND<	0.0226
NA	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	7996	ND<	0.0331
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	8615	ND<	0.0226
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	7918	ND<	0.0294
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	9100	ND<	0.0461
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	4950	ND<	0.0344
NA	OCTA-CDF	442/444 (87/100)	442+444	2.121	3617	ND<	0.0459
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	7996	ND<	0.0331
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	3979	ND<	0.0223
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	5005	ND<	0.0381
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	9216	ND<	0.0817
NA	OCTA-CDD	458/460 (87/100)	458+460	1.978	5374	ND<	0.0731

GC/MS ANALYST: K. THORNBURG ANALYSIS DATE: 3/8/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/17/88
DATA ENTRY: P. PERKINS ENTRY DATE: 5/18/88

REVIEWED:__________ DATE:______
REVIEWED: Mike Molloy DATE: 5/17/88
REVIEWED: DATE: 3/13/89

B20008XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8963L09
GC/MS DATA FILE: 8985C10X1
SAMPLE ID: 20008 (BACK 1/2) IN 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	98.0 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	24.0 NG
13C-2,3,7,8-TCDD	25.0 NG
13C-1,2,3,7,8-PeCDD	24.8 NG
13C-1,2,3,4,6,7,8-HpCDD	98.0 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2680	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1479420	NA	98.0	NA
1646	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	746736	20.74	NA	86.4
1736	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	588992	24.06	NA	96.2
2324	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	359070	22.70	NA	91.7
2956	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	1486640	141.44	NA	144.3
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	22719	ND<	0.490	0.100
2591	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	6266730		84.0	17.0
3197	13C-OCDF	454/456 (87/100)	454+456	1.946	4167680		141	29.4
1711	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	5307120		90.6	19.3
2708	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	3870580		75.1	15.3
3189	13C-OCDD	470/472 (87/100)	470+472	1.702	3750950		145	29.6

GC/MS ANALYST: KELLY T. ANALYSIS DATE: 3/10/88 DATA ENTRY REVIEWED: PJHarrison DATE: 4-19 88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/16/88 REVIEWED: Mike Molloy DATE: 3/16/88
DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/16/88 REVIEWED:________ DATE:________

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C10X1
SAMPLE ID: 20008 (BACK 1/2) IN 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	98	NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	24.00 NG
13C-2,3,7,8-TCDD	25.00 NG
13C-1,2,3,7,8-PeCDD	24.80 NG
13C-1,2,3,4,6,7,8-HpCDD	98.00 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
1647	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	85647		1.061
NA	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	10067	ND<	0.180
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	295536		3.54
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	52519		0.823
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	7768	ND<	0.0964
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.975	6566	ND<	0.112
NA	OCTA-CDF	442/444 (87/100)	442+444	2.121	4084	ND<	0.127
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	13316	ND<	0.239
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	4072	ND<	0.0963
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	11936	ND<	0.223
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	6533	ND<	0.142
NA	OCTA-CDD	458/460 (87/100)	458+460	1.978	3671	ND<	0.122

GC/MS ANALYST: K. THORNBURG ANALYSIS DATE: 3/10/88 REVIEWED:____________ DATE:________

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/16/88 REVIEWED: Mike Molloy DATE: 5/16/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/17/88 REVIEWED: J Cortes DATE: 3/13/89

X20009RI

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C24X1
SAMPLE ID: 20009 (XAD) IN 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	98.0 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.6 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2664	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	2755770	NA	98.0	NA
1633	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	169746	2.53	NA	52.7
1721	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	129764	2.85	NA	56.9
2305	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	89632	3.04	NA	61.5
2941	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	206474	10.55	NA	53.8
2164	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	20684200		358	73.0
2574	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	8079000		156	31.5
3177	13C-OCDF	454/456 (87/100)	454+456	1.946	4140150		202	42.1
1696	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	9440630		146	31.1
2691	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	5206090		145	29.7
3169	13C-OCDD	470/472 (87/100)	470+472	1.702	3960770		221	45.1

GC/MS ANALYST:	GENE O.	ANALYSIS DATE:	3/24/88	DATA ENTRY REVIEWED: Harrison	DATE: 4-18-88
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	4/2/88	REVIEWED: Mike Molloy	DATE: 4/2/88
DATA ENTRY:	MIKE MOLLOY	ENTRY DATE:	4/2/88	REVIEWED:	DATE:

495

X20009RI

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C24X1
SAMPLE ID: 20009 (XAD) IN 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	98	NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.60 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
1634	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	145415		1.59
NA	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	17699	ND<	0.288
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	487741		5.32
2053	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	56625		0.711
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	4716	ND<	0.0843
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	4895	ND<	0.120
NA	OCTA-CDF	442/444 (87/100)	442+444	2.121	9173	ND<	0.411
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	26430		0.430
2183	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	17600		0.334
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	14033	ND<	0.377
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	17433	ND<	0.545
NA	OCTA-CDD	458/460 (87/100)	458+460	1.978	5374	ND<	0.258

GC/MS ANALYST: GENE O. ANALYSIS DATE: 3/24/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/19/88
DATA ENTRY: P. PERKINS ENTRY DATE: 5/23/88

REVIEWED:________ DATE:________
REVIEWED: Mike Molloy DATE: 5/19/88
REVIEWED: J Coates DATE: 3/13/89

500

C20015XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C09X6
SAMPLE ID: 20015-16 (CYCLONE/FILTER) IN 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.6 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2642	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1791960	NA	19.6	NA
1611	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	782688	3.59	NA	74.8
1701	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	579856	3.91	NA	78.2
2283	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	463488	4.84	NA	97.7
2920	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	1433660	22.52	NA	115
2143	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	209164		NA	NA
2553	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	46248600 *		129	26.0
3159	13C-OCDF	454/456 (87/100)	454+456	1.946	31509100 *		221	46.1
1675	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	37835200 *		131	27.9
2670	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	30928800 *		124	25.4
3151	13C-OCDD	470/472 (87/100)	470+472	1.702	29841600 *		240	48.9

* = SEE FILES C20015DL AND C20015DR FOR QUANTITATION OF SAMPLE DILUTION.

GC/MS ANALYST: DAVE MILLS   ANALYSIS DATE: 3/9/88
DATA ANALYST: MIKE MOLLOY   ANALYSIS DATE: 3/16/88
DATA ENTRY: MIKE MOLLOY   ENTRY DATE: 3/16/88

DATA ENTRY REVIEWED: BS   DATE: 4/19/88
REVIEWED: Mike Molloy   DATE: 3/16/88
REVIEWED: ____________   DATE: ________

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C09X6
SAMPLE ID: 20015-16 (CYCLONE/FILTER) IN 420

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,9-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.60 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA	AMOUNT IN SAMPLE (NG)
1615	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	10796080	25.5
1702	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	243360	0.886
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	90293710	213
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	30931837	75.1
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	14958849	38.5
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	5519220	19.5
3160	OCTA-CDF	442/444 (87/100)	442+444	2.121	819776	5.29
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	64448013	235
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	33223858	122
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	20922917	80.9
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	12145930	54.7
3152	OCTA-CDD	458/460 (87/100)	460	1.055	3099390	40.2

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/9/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/17/88
DATA ENTRY: P. PERKINS ENTRY DATE: 5/18/88

REVIEWED:________________ DATE:________
REVIEWED: Mike Molloy DATE: 5/17/88
REVIEWED: J Coates DATE: 3/13/89

C2001SRI

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C09X7
SAMPLE ID: 20015-16 (CYCLONE/FILTER) IN 420 RI

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.6 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2642	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1888780	NA	19.6	NA
1613	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	820224	3.57	NA	74.4
1701	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	586304	3.75	NA	75.0
2292	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	576852	5.71	NA	115
2918	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	1599400	23.84	NA	122
2143	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	219868		NA	NA
2552	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	48705700 *		121	24.5
3158	13C-OCDF	454/456 (87/100)	454+456	1.946	33141200 *		209	43.5
1676	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	38817600 *		133	28.3
2569	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	31914800 *		115	23.5
3151	13C-OCDD	470/472 (87/100)	470+472	1.702	31355600 *		226	46.1

* = SEE FILES C2001SDL AND C2001SDR FOR QUANTITATION OF SAMPLE DILUTION.

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/9/88
DATA ENTRY REVIEWED: DATE: 4/13/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/16/88
REVIEWED: Mike Molloy DATE: 3/16/88
DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/16/88
REVIEWED: DATE:

C20015RI

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C09X7
SAMPLE ID: 20015-16 (CYCLONE/FILTER) IN 420 RI

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.60 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA	AMOUNT IN SAMPLE (NG)
1616	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	10876150	24.5
1704	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	280720	1.01
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	91937033	207
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	33336445	65.1
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	15439700	35.6
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	4846146	15.3
3159	OCTA-CDF	442/444 (87/100)	442+444	2.121	906664	5.24
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	68716930	248
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	34290172	101
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	22532347	78.1
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	12740490	51.4
3152	OCTA-CDD	458/460 (87/100)	460	1.055	3785850	44.0

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/9/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/18/88
DATA ENTRY: P. PERKINS ENTRY DATE: 5/18/88

REVIEWED:____________ DATE:______
REVIEWED: Mike Molloy DATE: 5/18/88
REVIEWED: J Coates DATE: 3/13/89

C20015DL

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C21X1
SAMPLE ID: 20015/16 (CYC/FLTR) IN 420 DILUTION

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	98.0 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.6 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2667	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1768510	NA	98.0	NA
1632	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	173046	4.02	NA	83.8
1721	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	153744	5.25	NA	105
2310	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	108881	5.76	NA	116
2941	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	306543	24.40	NA	124
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	NA		NA	NA
2578	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	9649170		126	25.4
3177	13C-OCDF	454/456 (87/100)	454+456	1.946	6692950		220	45.8
1695	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	7429970		97.2	20.7
2694	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	6488880		122	24.9
3169	13C-OCDD	470/472 (87/100)	470+472	1.702	6443280		242	49.4

GC/MS ANALYST: KELLY T. ANALYSIS DATE: 3/21/88 DATA ENTRY REVIEWED: AJHarrison DATE: 4-18-88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/23/88 REVIEWED: Mike Molloy DATE: 3/23/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/23/88 REVIEWED:________ DATE:________

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Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C21X1
SAMPLE ID: 20015-16 (CYC/FLTR) IN 420 DILUTION

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD 98 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.60 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA	AMOUNT IN SAMPLE (NG)
1635	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	2203262	23.6
1723	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	57568	0.791
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	13781570 *	147
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	6263586 **	64.8
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	3299621	39.7
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	1042654	17.2
3177	OCTA-CDF	442/444 (87/100)	442+444	2.121	168224	5.07
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	12078564	166
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	6661715	104
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	4523227	81.8
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	2644638	55.7
NA	OCTA-CDD	458/460 (87/100)	460	1.055	644960	39.1

* = FIRST THREE PEAKS FOR TCDF WERE MISSED (APPROXIMATELY 10% OF TOTAL TCDF). ** = FIRST PCDF PEAK WAS MISSED (APPROXIMATELY 9% OF TOTAL PCDF)

GC/MS ANALYST: K. THORNBURG ANALYSIS DATE: 3/21/88 REVIEWED:________ DATE:________

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/18/88 REVIEWED: Mike Molloy DATE: 5/18/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/19/88 REVIEWED: DATE: 3/13/89

CZ0015DR

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985CZZX1
SAMPLE ID: 20015/16 (C/F) IN 420 OIL REP INJ

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	98.0 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.6 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2643	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	2008380	NA	98.0	NA
1610	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	187713	3.84	NA	80.0
1698	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	180128	5.42	NA	108
2285	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	145688	6.78	NA	137
2920	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	369544	25.90	NA	132
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	NA		NA	NA
2554	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	11015030		119	24.0
3157	13C-OCDF	454/456 (87/100)	454+456	1.946	7074160		193	40.2
1673	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	8070000		90.1	19.2
2671	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	6949520		108	22.1
3149	13C-OCDD	470/472 (87/100)	470+472	1.702	6801780		212	43.2

GC/MS ANALYST: KELLY T. ANALYSIS DATE: 3/22/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/23/88
DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/23/88

DATA ENTRY REVIEWED: PJHarrison DATE: 4-18.88
REVIEWED: Mike Molly DATE: 3/23/88
REVIEWED:________ DATE:________

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C22X1
SAMPLE ID: 20015-16 (C/F) IN 420 OIL REP INJ

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	98 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.60 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA	AMOUNT IN SAMPLE (NG)
1613	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	2370260	23.4
1700	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	61752	0.724
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	18751457	185
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	7263033	56.1
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	3652057	36.5
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	1195039	16.4
3157	OCTA-CDF	442/444 (87/100)	442+444	2.121	190677	4.77
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	14030762	165
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	6353958	74.1
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	5663298	85.0
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	2909424	50.8
NA	OCTA-CDD	458/460 (87/100)	460	1.055	737008	37.1

GC/MS ANALYST: K. THORNBURG ANALYSIS DATE: 3/22/88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/18/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/19/88

REVIEWED: ____________________ DATE: ________

REVIEWED: Mike Molloy DATE: 5/18/88

REVIEWED: J Coats DATE: 3/13/89

5of

F20017XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C08X3
SAMPLE ID: 20017 (FRONT 1/2) IN 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.6 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2647	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1820360	NA	19.6	NA
1620	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	773296	3.49	NA	72.7
1709	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	608576	4.04	NA	80.8
2290	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	370692	3.81	NA	77.0
2922	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	1131670	17.50	NA	89.3
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.155	NA		NA	NA
2558	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	3669630		12.9	2.61
3162	13C-OCDF	454/456 (87/100)	454+456	1.946	2581220		23.0	4.79
1684	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	3383060		11.2	2.38
2674	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	2314210		11.8	2.41
3155	13C-OCDD	470/472 (87/100)	470+472	1.702	2359060		24.0	4.90

GC/MS ANALYST: KELLY T. ANALYSIS DATE: 3/8/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/15/88
DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/15/88

DATA ENTRY REVIEWED: BHarrison DATE: 4-18-88
REVIEWED: Mike Molloy DATE: 3/15/88
REVIEWED: ____________ DATE: ____________

F20017XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C08X3
SAMPLE ID: 20017 (FRONT 1/2) IN 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.60 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
1624	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	560252		1.34
NA	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	12836	ND<	0.0445
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	4951263		11.8
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	1653902		5.02
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	613351		2.00
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	221845		0.992
3163	OCTA-CDF	442/444 (87/100)	442+444	2.121	25265		0.206
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	568595		1.97
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	435981		2.00
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	246757		1.21
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	313863		1.79
NA	OCTA-CDD	458/460 (87/100)	458+460	1.978	5374	ND<	0.0470

GC/MS ANALYST: K. THORNBURG ANALYSIS DATE: 3/8/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/17/88
DATA ENTRY: P. PERKINS ENTRY DATE: 5/18/88

REVIEWED: ____________________ DATE: ________
REVIEWED: Mike Molloy DATE: 5/17/88
REVIEWED: J Coates DATE: 3/13/89

920018XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985B19X4
SAMPLE ID: 20018(BACK 1/2)

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	98.0 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	24.0 NG
13C-2,3,7,8-TCDD	25.0 NG
13C-1,2,3,7,8-PeCDD	24.8 NG
13C-1,2,3,4,6,7,8-HpCDD	98.0 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/19/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2644	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1668890	NA	98.0	NA
1611	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.487	765563	18.08	NA	75.3
1700	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.742	552554	18.62	NA	74.5
2285	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	346136	19.39	NA	78.3
2920	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.729	1167260	94.06	NA	96.0
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.348	16473	ND<	0.35	0.072
2555	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.472	3129340		58.7	11.9
3157	13C-OCDF	454/456 (87/100)	454+456	2.316	840324		30.5	6.35
1677	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.358	5235160		100	21.4
2671	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.030	1428284		39.6	8.08
3150	13C-OCDD	470/472 (87/100)	470+472	2.029	636592		26.4	5.38

GC/MS ANALYST: K. THORNBURG ANALYSIS DATE: 2/19/88 DATA ENTRY REVIEWED: Mike Molloy DATE: 3/4/88

DATA ANALYST: J. PALAUSKY ANALYSIS DATE: 2/26/88 REVIEWED: Mike Molloy DATE: 3/4/88

DATA ENTRY: J. PALAUSKY ENTRY DATE: 2/26/88 REVIEWED:________ DATE:________

B20018XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985B19X4
SAMPLE ID: 20018 (BACK 1/2)

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	98 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	24.00 NG
13C-2,3,7,8-TCDD	25.00 NG
13C-1,2,3,7,8-PeCDD	24.80 NG
13C-1,2,3,4,6,7,8-HpCDD	98.00 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
1615	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	422540		5.11
NA	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	11886	ND<	0.227
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	4422063		53.4
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	994745		16.2
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	255979		4.045
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	61422		1.33
3189	OCTA-CDF	442/444 (87/100)	442+444	2.121	5379		0.213
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	176469		3.37
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	65801		1.61
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	33473		0.795
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	30055		0.831
NA	OCTA-CDD	458/460 (87/100)	458+460	1.978	5374	ND<	0.228

GC/MS ANALYST:	K. THORNBURG	ANALYSIS DATE:	2/19/88	REVIEWED:	DATE:
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	5/19/88	REVIEWED: Mike Molloy	DATE: 5/19 88
DATA ENTRY:	P. PERKINS	ENTRY DATE:	5/19/88	REVIEWED:	DATE: 3/13/89

X20019XX

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C22X2
SAMPLE ID: 20019 (XAD) IN 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	98.0 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.6 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2646	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1790490	NA	98.0	NA
1614	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	217525	4.99	NA	104
1703	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	139338	4.70	NA	94.0
2288	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	104676	5.47	NA	110
2924	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	194070	15.25	NA	77.8
2145	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	23803300		352	71.9
2558	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	656730		13.5	2.73
3161	13C-OCDF	454/456 (87/100)	454+456	1.946	165685		8.60	1.79
1678	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	1077754		15.6	3.31
2675	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	316450		9.40	1.92
3153	13C-OCDD	470/472 (87/100)	470+472	1.702	126731		7.52	1.53

GC/MS ANALYST: KELLY T. ANALYSIS DATE: 3/22/88 DATA ENTRY REVIEWED: BJHarrison DATE: 4-18-88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/23/88 REVIEWED: Mike Molloy DATE: 3/23/88
DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/23/88 REVIEWED:________ DATE:________

X20019XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C22X2
SAMPLE ID: 20019 (XAD) IN 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	98 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.60 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
1617	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	122479		1.042
NA	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	16732	ND<	0.254
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	1031984		8.78
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	134290		1.44
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	17343		0.330
2842	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	8279		0.216
3062	OCTA-CDF	442/444 (87/100)	442+444	2.121	10556		0.503
1445	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	20599		0.312
2205	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	12980		0.211
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	6659	ND<	0.190
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	7267	ND<	0.242
NA	OCTA-CDD	458/460 (87/100)	458+460	1.978	5374	ND<	0.274

GC/MS ANALYST: K. THORNBURG ANALYSIS DATE: 3/22/88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/18/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/18/88

REVIEWED:__________ DATE:________

REVIEWED: Mike Molloy DATE: 5/19/88

REVIEWED: J Bats DATE: 3/13/89

F20026XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C08X4
SAMPLE ID: 20026 (FILTER) OUT 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD 19.6 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	9.60 NG
13C-2,3,7,8-TCDD	10.0 NG
13C-1,2,3,7,8-PeCDD	9.90 NG
13C-1,2,3,4,6,7,8-HpCDD	39.2 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2645	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	2614650	NA	19.6	NA
1617	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	2257210	7.10	NA	73.9
1705	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	1575770	7.28	NA	72.8
2287	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	950784	6.80	NA	68.7
2921	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	3267000	35.17	NA	89.7
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	NA		NA	NA
2556	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	10111420		24.7	4.99
3163	13C-OCDF	454/456 (87/100)	454+456	1.946	9792370		60.4	12.6
1680	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	7926770		20.2	4.30
2672	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	7348470		25.9	5.29
3154	13C-OCDD	470/472 (87/100)	470+472	1.702	9498000		66.9	13.7

GC/MS ANALYST: KELLY T. ANALYSIS DATE: 3/8/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/15/88
DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/15/88

DATA ENTRY REVIEWED: AJHarrison DATE: 4-18 88
REVIEWED: Mike Molloy DATE: 3/15/88
REVIEWED:__________ DATE:__________

FZ0026XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C08X4
SAMPLE ID: 20026 (FILTER) OUT 250

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	9.60 NG
13C-2,3,7,8-TCDD	10.00 NG
13C-1,2,3,7,8-PeCDD	9.90 NG
13C-1,2,3,4,6,7,8-HpCDD	39.20 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/98)	TOTAL AREA	AMOUNT IN SAMPLE (NG)
1620	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	2388810	3.92
1707	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	58816	0.158
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	20508868	33.6
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	7071800	16.7
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	3220714	7.27
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	1305480	4.04
3163	OCTA-CDF	442/444 (87/100)	442+444	2.121	193678	1.10
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	2353587	6.31
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	2682528	9.59
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	2872912	9.75
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	2487992	9.83
NA	OCTA-CDD	458/460 (87/100)	460	1.055	856480	9.74

GC/MS ANALYST:	K. THORNBURG	ANALYSIS DATE:	3/9/88	REVIEWED:	DATE:
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	5/17/88	REVIEWED: Mike Molloy	DATE: 5/17/88
DATA ENTRY:	P. PERKINS	ENTRY DATE:	5/18/88	REVIEWED: J Coats	DATE: 3/13/89

F20027XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C08X5
SAMPLE ID: 20027 (FRONT 1/2) OUT 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.6 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2649	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1600190	NA	19.6	NA
1622	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	790984	4.06	NA	84.6
1711	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	506432	3.82	NA	76.5
2292	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	311016	3.64	NA	73.4
2923	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	932080	16.40	NA	83.7
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	NA		NA	NA
2560	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	783055		3.35	0.677
3164	13C-OCDF	454/456 (87/100)	454+456	1.946	704860		7.62	1.59
1685	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	616678		2.45	0.521
2676	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	558200		3.45	0.705
3156	13C-OCDD	470/472 (87/100)	470+472	1.702	714308		8.82	1.80

GC/MS ANALYST: KELLY T. ANALYSIS DATE: 3/8/88 DATA ENTRY REVIEWED: PJHarrison DATE: 4-18-88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/15/88 REVIEWED: Mike Molloy DATE: 3/15/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/15/88 REVIEWED:________ DATE:________

F20027XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 898SL09
GC/MS DATA FILE: 898SC08XS
SAMPLE ID: 20027 (FRONT 1/2) OUT 250

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.60 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
1627	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	318746		0.746
NA	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	9491	ND<	0.0396
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	2295904		5.37
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	800218		2.90
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	356656		1.41
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	181870		0.987
3164	OCTA-CDF	442/444 (87/100)	442+444	2.121	22853		0.227
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	191031		0.797
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	230499		1.26
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	422549		2.51
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	435034		3.01
3157	OCTA-CDD	458/460 (87/100)	458+460	1.978	248027		2.64

GC/MS ANALYST: K. THORNBURG ANALYSIS DATE: 3/8/88 REVIEWED:________ DATE:________

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/17/88 REVIEWED: Mike Molloy DATE: 5/17/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/18/88 REVIEWED: DATE: 3/13/89

820028XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985B19X5
SAMPLE ID: 20028(BACK 1/2)

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	98.0 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	24.0 NG
13C-2,3,7,8-TCDD	25.0 NG
13C-1,2,3,7,8-PeCDD	24.8 NG
13C-1,2,3,4,6,7,8-HpCDD	98.0 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/19/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2645	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1772800	NA	98.0	NA
1615	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.487	776808	17.27	NA	71.9
1703	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.742	572960	18.18	NA	72.7
2297	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	437856	23.09	NA	93.3
2921	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.729	1168750	88.66	NA	90.5
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.348	32240	ND<	0.54	0.11
2556	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.472	18494040 *		347	70.0
3158	13C-OCDF	454/456 (87/100)	454+456	2.316	7241610 *		262	54.6
1679	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.358	16790260 *		311	66.1
2673	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.030	11522650 *		319	65.1
3150	13C-OCDD	470/472 (87/100)	470+472	2.028	6684300 *		276	56.4

* = SEE FILE 8200280L FOR QUANTITATION OF DILUTED SAMPLE.

GC/MS ANALYST: K. THORNBURG ANALYSIS DATE: 2/19/88
DATA ANALYST: J. PALAUSKY ANALYSIS DATE: 2/29/88
DATA ENTRY: J. PALAUSKY ENTRY DATE: 2/29/88

DATA ENTRY REVIEWED: Mike Milby DATE: 3/4/88
REVIEWED: Mike Milby DATE: 3/4/88
REVIEWED: ____________ DATE: ____________

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985B19X5
SAMPLE ID: 20028 (BACK 1/2)

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	98 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	24.00 NG
13C-2,3,7,8-TCDD	25.00 NG
13C-1,2,3,7,8-PeCDD	24.80 NG
13C-1,2,3,4,6,7,8-HpCDD	98.00 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA	AMOUNT IN SAMPLE (NG)
1618	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	4198770	50.0
1706	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	88914	1.64
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	34782370	414
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	11730635	151
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	4706086	74.3
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.975	1218451	26.4
3159	OCTA-CDF	442/444 (87/100)	442+444	2.121	99531	3.94
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	2477996	45.7
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	1877620	36.4
NA	TOTAL-HEXA-CDD	390/392 (100/92)	390+392	3.535	950355	22.5
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	648151	17.9
NA	OCTA-CDD	458/460 (87/100)	458+460	1.978	190624	8.08

GC/MS ANALYST: K. THORNBURG ANALYSIS DATE: 2/19/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/19/88
DATA ENTRY: P. PERKINS ENTRY DATE: 5/19/88

REVIEWED: ____________________ DATE: __________
REVIEWED: Mike Molloy DATE: 5/19/88
REVIEWED: J Coats DATE: 3/14/89

B200280L

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C10X4
SAMPLE ID: 20028 (BACK 1/2) OUT 250 (D/L)

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	98.0 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	24.0 NG
13C-2,3,7,8-TCDD	25.0 NG
13C-1,2,3,7,8-PeCDD	24.8 NG
13C-1,2,3,4,6,7,8-HpCDD	98.0 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/19/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2678	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	916976	NA	98.0	NA
1646	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.487	475904	20.45	NA	85.2
1737	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.742	327770	20.10	NA	80.4
2322	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	214341	21.85	NA	88.3
2955	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.729	615192	90.22	NA	92.1
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.348	16364	NDK	0.564	0.115
2590	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.472	9337620		333	67.2
3197	13C-OCDF	454/456 (87/100)	454+456	2.316	4665390		321	66.9
1711	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.358	10040060		325	69.1
2706	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.030	5735150		301	61.5
3189	13C-OCDD	470/472 (87/100)	470+472	2.028	4036420		317	64.7

GC/MS ANALYST: K. THORNBURG ANALYSIS DATE: 3/10/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/16/88
DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/16/88

DATA ENTRY REVIEWED: PJHarrison DATE: ~~4-2~~ 4-19-88 EE RH 4-19-88
REVIEWED: Mike Molloy DATE: 3/16/88
REVIEWED: DATE:

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C10X4
SAMPLE ID: 20028 (BACK 1/2) OUT 250 (OIL)

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD 98 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	24.00 NG
13C-2,3,7,8-TCDD	25.00 NG
13C-1,2,3,7,8-PeCDD	24.80 NG
13C-1,2,3,4,6,7,8-HpCDD	98.00 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
1650	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	2191718		42.6
1738	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	48887		1.57
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	19914459		387
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	6965767		183
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	2149949		64.5
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	591500		24.3
3197	OCTA-CDF	442/444 (87/100)	442+444	2.121	52406		3.94
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	1268632		40.9
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	854945		33.9
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	396021		17.8
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	320214		16.8
NA	OCTA-CDD	458/460 (87/100)	458+460	1.978	5374	ND<	0.433

GC/MS ANALYST: K. THORNBURG ANALYSIS DATE: 3/10/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/16/88
DATA ENTRY: P. PERKINS ENTRY DATE: 5/17/88

REVIEWED:________ DATE:________
REVIEWED: Mike Molloy DATE: 5/16/88
REVIEWED: J Coates DATE: 3/14/89

X20029XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C21X5
SAMPLE ID: 20029 (XAD) OUT 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	98.0 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.6 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2663	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1657830	NA	98.0	NA
1630	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	204613	5.07	NA	106
1719	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	110318	4.02	NA	80.4
2307	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	81572	4.60	NA	93.0
2936	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	176288	14.97	NA	76.4
2162	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	22332870		424	86.6
2574	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	1625464		36.8	7.43
3174	13C-OCDF	454/456 (87/100)	454+456	1.946	672784		38.4	8.01
1693	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	2558370		46.6	9.92
2690	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	978088		32.0	6.53
3166	13C-OCDD	470/472 (87/100)	470+472	1.702	600892		39.2	8.01

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/21/88 DATA ENTRY REVIEWED: PHarrison DATE: 4-18-88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/22/88 REVIEWED: Mike Molloy DATE: 3/22/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/22/88 REVIEWED:________ DATE:________

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X20029XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C21XS
SAMPLE ID: 20029 (XAD) OUT 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD 98 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.60 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
1633	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	496824		4.49
1720	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	11119		0.213
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	5279935		47.8
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	1072812		14.8
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	280217		5.36
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	59798		1.72
NA	OCTA-CDF	442/444 (87/100)	442+444	2.121	5906	ND<	0.310
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	227788		4.36
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	54323		1.13
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	28779		0.905
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	36659		1.34
NA	OCTA-CDD	458/460 (87/100)	458+460	1.978	5374	ND<	0.302

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/21/88 REVIEWED:________ DATE:______

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/18/88 REVIEWED: Mike Molloy DATE: 5/18/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/19/88 REVIEWED: J Costs DATE: 3/14/89

F20036XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C08X6
SAMPLE ID: 20036 (FILTER) OUT 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.6 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2644	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	2326520	NA	19.6	NA
1617	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	985312	3.13	NA	65.2
1706	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	701200	3.64	NA	72.8
2287	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	438100	3.52	NA	71.2
2920	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	1613500	19.52	NA	99.6
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	NA		NA	NA
2555	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	15818740 *		39.1	7.90
3160	13C-OCDF	454/456 (87/100)	454+456	1.946	22921400 *		143	29.8
1679	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	10087540 *		28.9	6.15
2671	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	12809650 *		45.8	9.34
3154	13C-OCDD	470/472 (87/100)	470+472	1.702	23250200 *		166	33.9

* = SEE FILE F20036DL FOR QUANTITATION OF SAMPLE DILUTION.

GC/MS ANALYST:	DAVE MILLS	ANALYSIS DATE:	3/8/88	DATA ENTRY REVIEWED: PJHarrison	DATE: 4-18-88
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	3/15/88	REVIEWED: Mike Molloy	DATE: 3/15/88
DATA ENTRY:	MIKE MOLLOY	ENTRY DATE:	3/15/88	REVIEWED:	DATE:

F20036XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C08X6
SAMPLE ID: 20036 (FILTER) OUT 250

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.60 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA	AMOUNT IN SAMPLE (NG)
1620	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	3117750	6.52
1706	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	55726	0.168
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	25263682	52.8
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	10138263	26.1
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	4819391	11.0
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	2021508	6.34
3161	OCTA-CDF	442/444 (87/100)	442+444	2.121	358364	2.05
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	2752938	8.29
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	3498141	13.6
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	3881936	13.3
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	3626296	14.5
NA	OCTA-CDD	458/460 (87/100)	460	1.055	1264030	14.6

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/8/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/17/88
DATA ENTRY: P. PERKINS ENTRY DATE: 5/18/88

REVIEWED:__________ DATE:______
REVIEWED: Mike Molloy DATE: 5/17/88
REVIEWED: JWates DATE: 3/14/59

F20036DL

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C21X2
SAMPLE ID: 20036 (FILTER) OUT 250 (DILUTION)

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	58.8 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.6 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2568	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1840560	NA	58.8	NA
1638	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	245340	3.29	NA	68.5
1730	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	180288	3.55	NA	71.0
2313	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	163582	4.99	NA	101
2941	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	400446	18.37	NA	93.7
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	NA		NA	NA
2580	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	4109410		40.9	8.27
3177	13C-OCDF	454/456 (87/100)	454+456	1.946	4936400		124	25.9
1703	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	2757300		30.7	6.54
2695	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	3242300		46.7	9.53
3169	13C-OCDD	470/472 (87/100)	470+472	1.702	5131300		148	30.1

GC/MS ANALYST: KELLY T. ANALYSIS DATE: 3/21/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 4/1/88
DATA ENTRY: MIKE MOLLOY ENTRY DATE: 4/1/88

DATA ENTRY REVIEWED: PJHarrison DATE: 4-18-88
REVIEWED: Mike Molloy DATE: 4/1/88
REVIEWED: ____________ DATE: ____________

F20036DL

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C21X2
SAMPLE ID: 20036 (FILTER) OUT 250 (DILUTION)

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	58.8 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.60 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA	AMOUNT IN SAMPLE (NG)
1643	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	872688	6.58
1730	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	9818	0.115
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	6744114	50.9
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	2589919	17.8
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	1302996	12.0
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	482984	6.10
3177	OCTA-CDF	442/444 (87/100)	442+444	2.121	84877	1.96
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	762986	8.94
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	898884	9.34
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	900489	12.5
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	888837	14.3
NA	OCTA-CDD	458/460 (87/100)	460	1.055	276968	12.8

GC/MS ANALYST:	K. THORNBURG	ANALYSIS DATE:	3/21/88	REVIEWED: ____________	DATE: ________
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	5/18/88	REVIEWED: Mike Molloy	DATE: 5/18/88
DATA ENTRY:	P. PERKINS	ENTRY DATE:	5/19/88	REVIEWED:	DATE: 3/14/89

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SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C08K7
SAMPLE ID: 20037 (FRONT 1/2) OUT 250

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.6 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2640	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	2127950	NA	19.6	NA
1611	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	862928	3.33	NA	69.4
1700	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	618608	3.51	NA	70.3
2292	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	394444	3.47	NA	70.0
2916	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	1325980	17.54	NA	89.5
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	NA		NA	NA
2552	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	1942634		5.84	1.18
3157	13C-OCDF	454/456 (87/100)	454+456	1.946	2546880		19.3	4.03
1675	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	1204029		3.91	0.833
2668	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	1423184		6.19	1.26
3149	13C-OCDD	470/472 (87/100)	470+472	1.702	2380920		20.7	4.22

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/8/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/15/88
DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/15/88

DATA ENTRY REVIEWED: PJarrism DATE: 4-18-88
REVIEWED: Mike Molloy DATE: 3/15/88
REVIEWED: ________ DATE: ________

F20037XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C08X7
SAMPLE ID: 20037 (FRONT 1/2) OUT 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.90 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.60 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
1615	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	537452		1.15
NA	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	28236	ND<	0.0964
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	4309441		9.24
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	1719686		4.91
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	929533		2.53
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	464647		1.77
3158	OCTA-CDF	442/444 (87/100)	442+444	2.121	90357		0.630
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	279707		0.955
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	396866		1.71
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	899431		3.76
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	1067220		5.20
NA	OCTA-CDD	458/460 (87/100)	458+460	1.978	NA *		

* * SEE FILE F20037X0 FOR PEAK HEIGHT QUANTITATION OF OCDD.

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/8/88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/17/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/18/88

REVIEWED: ____________ DATE: ________

REVIEWED: Mike Molloy DATE: 5/17/88

REVIEWED: ____________ DATE: 3/14/89

F20037X0

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C08K7
SAMPLE ID: 20037 (FRONT 1/2) OUT 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.6 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY.= (PEAK HEIGHT(S)/PEAK HEIGHT(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (PEAK HEIGHT(S)/PEAK HEIGHT(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	PEAK HEIGHT	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2640	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	342016	NA	19.6	NA
2916	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.738	218880	17.00	NA	86.7

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/8/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/24/88
DATA ENTRY: MIKE MOLLOY ENTRY DATE: 5/24/88

DATA ENTRY REVIEWED:______ DATE:______
REVIEWED: Mike Molloy DATE: 5/24/88
REVIEWED: J Bates DATE: 3/14/89

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F20037X0

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L39
GC/MS DATA FILE: 8985C08X7
SAMPLE ID: 20037 (FRONT 1/2) OUT 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.60 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (PEAK HEIGHT(S)/PEAK HEIGHT(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	PEAK HEIGHT	AMOUNT IN SAMPLE (NG)
3150	OCTA-CDD	458/460 (87/100)	460	0.924	56384	5.46

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/8/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/24/88
DATA ENTRY: P. PERKINS ENTRY DATE: 5/24/88

REVIEWED:__________ DATE:______
REVIEWED: Mike Molloy DATE: 5/24/88
REVIEWED: J Waits DATE: 3/14/89

B20038XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C10X3
SAMPLE ID: 20038 (BACK 1/2) OUT 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	196 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	24.0 NG
13C-2,3,7,8-TCDD	25.0 NG
13C-1,2,3,7,8-PeCDD	24.8 NG
13C-1,2,3,4,6,7,8-HpCDD	98.0 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2676	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1798830	NA	196	NA
1643	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	418808	19.14	NA	79.7
1734	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	282368	18.97	NA	75.9
2318	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	213108	22.16	NA	89.5
2952	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	643208	100.66	NA	103
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	22646	ND<	0.823	0.168
2586	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	7380720		229	46.2
3193	13C-OCDF	454/456 (87/100)	454+456	1.946	2939820		230	47.9
1707	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	6592980		235	49.9
2703	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	4415430		198	40.4
3196	13C-OCDD	470/472 (87/100)	470+472	1.702	2357240		211	43.1

GC/MS ANALYST: KELLY T. ANALYSIS DATE: 3/10/88 DATA ENTRY REVIEWED: RHarrison DATE: 4-19-88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/16/88 REVIEWED: Mike Molly DATE: 3/16/88
DATA ENTRY: MIKE.MOLLOY ENTRY DATE: 3/16/88 REVIEWED: DATE:

B20038XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C10X3
SAMPLE ID: 20038 (BACK 1/2) OUT 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	196	NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	24.00 NG
13C-2,3,7,8-TCDD	25.00 NG
13C-1,2,3,7,8-PeCDD	24.80 NG
13C-1,2,3,4,6,7,8-HpCDD	98.00 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
1647	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	1764176		38.98
1735	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	34350		1.28
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	14208870		314
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	5240388		138
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	1812664		51.99
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	494389		19.4
3194	OCTA-CDF	442/444 (87/100)	442+444	2.121	36261		2.61
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	856601		32.03
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	584189		23.3
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	313388		13.5
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	263953		13.2
NA	OCTA-CDD	458/460 (87/100)	458+460	1.978	5374	ND<	0.414

GC/MS ANALYST:	KELLY T.	ANALYSIS DATE:	3/10/88	REVIEWED:		DATE:	
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	5/16/88	REVIEWED:	Mike Molloy	DATE:	5/16/88
DATA ENTRY:	P. PERKINS	ENTRY DATE:	5/17/88	REVIEWED:	J Oates	DATE:	3/14/89

X20039XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 898SL09
GC/MS DATA FILE: 898SC21X6
SAMPLE ID: 20039 (XAD) OUT 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	98.0 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.6 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2661	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	433850	NA	98.0	NA
1628	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	175180	16.59	NA	346
1717	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	124448	17.33	NA	347
2304	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	64655	13.94	NA	281.6
2936	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	154896	50.25	NA	256.4
2162	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	19101910		458	93.4
2573	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	2601960		67.0	13.5
3172	13C-OCDF	454/456 (87/100)	454+456	1.946	610512		39.7	8.27
1691	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	4458930		72.0	15.3
2689	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	1431044		53.3	10.9
3164	13C-OCDD	470/472 (87/100)	470+472	1.702	568614		42.3	8.63

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/21/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/22/88
DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/22/88

DATA ENTRY REVIEWED: PJHarrison DATE: 4-1-88
REVIEWED: Mike Molloy DATE: 3/22/88
REVIEWED: ______ DATE: ______

X20039XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C21X6
SAMPLE ID: 20039 (XAD) OUT 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	98 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.60 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
1631	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	352442		10.06
1719	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	24257		0.412
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	10833552		114
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	2180677		37.98
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	552498		13.2
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	118744		3.88
3172	OCTA-CDF	442/444 (87/100)	442+444	2.121	4991		0.298
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	570027		9.67
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	126422		3.32
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	61026		2.18
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	57845		2.41
NA	OCTA-CDD	458/460 (87/100)	458+460	1.978	5374	NDK	0.344

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/21/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/20/88
DATA ENTRY: P. PERKINS ENTRY DATE: 5/23/88

REVIEWED:________________ DATE:________
REVIEWED: Mike Molloy DATE: 5/20/88
REVIEWED: J Lutz DATE: 3/14/85

(536)

F20045XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985B25X3
SAMPLE ID: 20045 (FILTER) BLK TRAIN 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD 19.6 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.6 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	NA
13C-1,2,3,4,7,8-HxCDF	NA
13C-OCDF	NA
13C-1,2,3,4-TCDD	NA
13C-1,2,3,7,8,9-HxCDD	NA
13C-OCDD	NA

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/19/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2642	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1074830	NA	19.6	NA
1617	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.487	676576	4.96	NA	103.4
1705	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.742	446880	4.68	NA	93.6
2287	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	278784	4.85	NA	98.0
2917	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.729	562432	14.07	NA	71.8
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.348	NA		NA	
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.472	3631	ND<	0.0283	
NA	13C-OCDF	454/456 (87/100)	454+456	2.316	3144	ND<	0.0473	
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.358	57895	ND<	0.275	
2669	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.030	21936		0.252	
NA	13C-OCDD	470/472 (87/100)	470+472	2.028	2837	ND<	0.0488	

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 2/25/88 DATA ENTRY REVIEWED: Timothy Grace DATE: 4/15/88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/14/88 REVIEWED: Mike Molloy DATE: 3/14/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/14/88 REVIEWED:________ DATE:________

F20045XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985B2SX3
SAMPLE ID: 20045 (FILTER) BLK TRAIN 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD 19.60 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.60 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	NA
13C-1,2,3,4,7,8-HxCDF	NA
13C-OCDF	NA
13C-1,2,3,4-TCDD	NA
13C-1,2,3,7,8,9-HxCDD	NA
13C-OCDD	NA

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
NA	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	6947	ND<	0.0190
NA	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	10123	ND<	0.0478
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	6947	ND<	0.0190
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	5477	ND<	0.0221
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	4559	ND<	0.0299
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	4626	ND<	0.0416
NA	OCTA-CDF	442/444 (87/100)	442+444	2.121	3579	ND<	0.0588
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	10123	ND<	0.0478
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	5068	ND<	0.0309
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	4139	ND<	0.0408
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	3206	ND<	0.0368
NA	OCTA-CDD	458/460 (87/100)	458+460	1.979	3547	ND<	0.0625

GC/MS ANALYST:	DAVE MILLS	ANALYSIS DATE:	2/25/88	REVIEWED:	DATE:
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	5/13/88	REVIEWED: Mike Molloy	DATE: 5/13/88
DATA ENTRY:	P. PERKINS	ENTRY DATE:	5/16/88	REVIEWED: J Loates	DATE: 3/14/89

F20046XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985B25XS
SAMPLE ID: 20046 (FRONT 1/2) BLK TRAIN 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.6 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	NA
13C-1,2,3,4,7,8-HxCDF	NA
13C-OCDF	NA
13C-1,2,3,4-TCDD	NA
13C-1,2,3,7,8,9-HxCDD	NA
13C-OCDD	NA

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/19/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2636	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1377160	NA	19.6	NA
1608	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.487	679568	3.89	NA	81.0
1696	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.742	484000	3.95	NA	79.1
2279	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	319744	4.34	NA	87.7
2913	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.729	603120	11.77	NA	60.1
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.348	NA		NA	
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.472	3413	ND<	0.0248	
NA	13C-OCDF	454/456 (87/100)	454+456	2.316	3563	ND<	0.0500	
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.358	46316	ND<	0.203	
2664	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.030	24139		0.259	
NA	13C-OCDD	470/472 (87/100)	470+472	2.028	3531	ND<	0.0566	

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 2/25/88 DATA ENTRY REVIEWED: Timothy Grace DATE: 4/15/88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/14/88 REVIEWED: Mike Molloy DATE: 3/14/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/14/88 REVIEWED:________ DATE:________

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985B25XS
SAMPLE ID: 20046 (FRONT 1/2) BLK TRAIN 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	9.80 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.60 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	NA
13C-1,2,3,4,7,8-HxCDF	NA
13C-OCDF	NA
13C-1,2,3,4-TCDD	NA
13C-1,2,3,7,8,9-HxCDD	NA
13C-OCDD	NA

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
NA	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	6368	ND<	0.0173
NA	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	13593	ND<	0.0593
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	6368	ND<	0.0173
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	5899	ND<	0.0208
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	2535	ND<	0.0155
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	7029	ND<	0.0590
NA	OCTA-CDF	442/444 (87/100)	442+444	2.121	2456	ND<	0.0376
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	13593	ND<	0.0593
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	4264	ND<	0.0227
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	2550	ND<	0.0234
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	2080	ND<	0.0223
NA	OCTA-CDD	458/460 (87/100)	458+460	1.978	4395	ND<	0.0722

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 2/25/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/13/88
DATA ENTRY: P. PERKINS ENTRY DATE: 5/16/88

REVIEWED:________ DATE:______
REVIEWED: Mike Molloy DATE: 5/13/88
REVIEWED: DATE: 3/14/89

B20047XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985B25X6
SAMPLE ID: 20047 (BACK 1/2) BLK TRAIN 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.6 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	NA
13C-1,2,3,4,7,8-HxCDF	NA
13C-OCDF	NA
13C-1,2,3,4-TCDD	NA
13C-1,2,3,7,8,9-HxCDD	NA
13C-OCDD	NA

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/19/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2641	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1055660	NA	19.6	NA
1624	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.487	705576	5.27	NA	110
1711	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.742	483200	5.15	NA	103
2298	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	285480	5.06	NA	102
2915	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.729	424344	10.81	NA	55.1
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.348	11877	ND<	0.0615	
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.472	4155	ND<	0.0429	
NA	13C-OCDF	454/456 (87/100)	454+456	2.316	3901	ND<	0.0778	
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.358	52105	ND<	0.229	
2668	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.030	14632		0.223	
NA	13C-OCDD	470/472 (87/100)	470+472	2.028	3289	ND<	0.0749	

GC/MS ANALYST: DAVE MILLS   ANALYSIS DATE: 2/25/88   DATA ENTRY REVIEWED: ______ DATE: 4/15/88

DATA ANALYST: MIKE MOLLOY   ANALYSIS DATE: 3/14/88   REVIEWED: Mike Molloy DATE: 3/14/88

DATA ENTRY: MIKE MOLLOY   ENTRY DATE: 3/14/88   REVIEWED: ______ DATE: ______

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B20047XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985B25X6
SAMPLE ID: 20047 (BACK 1/2) BLK TRAIN 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.60 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	NA
13C-1,2,3,4,7,8-HxCDF	NA
13C-OCDF	NA
13C-1,2,3,4-TCDD	NA
13C-1,2,3,7,8,9-HxCDD	NA
13C-OCDD	NA

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
NA	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	8306	ND<	0.0218
NA	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	8702	ND<	0.0380
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	8306	ND<	0.0218
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	9898	ND<	0.0390
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	2776	ND<	0.0241
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	3481	ND<	0.0415
NA	OCTA-CDF	442/444 (87/100)	442+444	2.121	2315	ND<	0.0504
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	8702	ND<	0.0380
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	9533	ND<	0.0567
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	2644	ND<	0.0346
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	4582	ND<	0.0697
NA	OCTA-CDD	458/460 (87/100)	458+460	1.978	4847	ND<	0.113

GC/MS ANALYST:	DAVE MILLS	ANALYSIS DATE:	2/25/88	REVIEWED: ______________	DATE: ________
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	5/13/88	REVIEWED: Mike Molloy	DATE: 5/13/88
DATA ENTRY:	P. PERKINS	ENTRY DATE:	5/16/88	REVIEWED:	DATE: 3/14/89

X20048XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985B25X7
SAMPLE ID: 20048 (XAD) BLK TRAIN 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.6 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	NA
13C-1,2,3,4,7,8-HxCDF	NA
13C-OCDF	NA
13C-1,2,3,4-TCDD	NA
13C-1,2,3,7,8,9-HxCDD	NA
13C-OCDD	NA

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/19/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2645	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	805280	NA	19.6	NA
1619	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.497	466944	4.57	NA	95.2
1708	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.742	396192	5.54	NA	111
2291	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	207872	4.83	NA	97.5
2920	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.729	349818	11.68	NA	59.6
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.348	15506	ND<	0.110	
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.472	1911	ND<	0.0239	
NA	13C-OCDF	454/456 (87/100)	454+456	2.316	3998	ND<	0.0967	
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.358	57895	ND<	0.310	
2674	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.030	18569		0.343	
NA	13C-OCDD	470/472 (87/100)	470+472	2.028	1967	ND<	0.0543	

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 2/25/88 DATA ENTRY REVIEWED: Timothy [illegible] DATE: 4/15/88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/14/88 REVIEWED: Mike Molloy DATE: 3/14/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/14/88 REVIEWED: ____________ DATE: ________

X20048XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985B25X7
SAMPLE ID: 20048 (XAD) BLK TRAIN 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.60 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	NA
13C-1,2,3,4,7,8-HxCDF	NA
13C-OCDF	NA
13C-1,2,3,4-TCDD	NA
13C-1,2,3,7,8,9-HxCDD	NA
13C-OCDD	NA

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
NA	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	9842	ND<	0.0390
NA	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	8484	ND<	0.0452
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	9842	ND<	0.0390
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	5635	ND<	0.0305
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	3640	ND<	0.0384
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	2045	ND<	0.0296
NA	OCTA-CDF	442/444 (87/100)	442+444	2.121	2773	ND<	0.0733
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	8584	ND<	0.0458
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	3834	ND<	0.0313
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	3358	ND<	0.0532
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	4040	ND<	0.0745
NA	OCTA-CDD	458/460 (87/100)	458+460	1.978	3224	ND<	0.0913

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 2/25/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/13/88
DATA ENTRY: P. PERKINS ENTRY DATE: 5/16/88

REVIEWED:__________ DATE:______
REVIEWED: Mike Molloy DATE: 5/13/88
REVIEWED: DATE: 3/14/89

C21005XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985B22X1
SAMPLE ID: 21005-6 (CYCLONE/FILTER)

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	98.0 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	24.0 NG
13C-2,3,7,8-TCDD	25.0 NG
13C-1,2,3,7,8-PeCDD	24.8 NG
13C-1,2,3,4,6,7,8-HpCDD	98.0 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/19/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2682	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1412190	NA	98.0	NA
1653	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.487	672380	18.76	NA	78.2
1743	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.742	442112	17.61	NA	70.4
2327	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	316744	20.97	NA	84.6
2956	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.729	988618	94.14	NA	96.1
2178	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.348	9419		0.22	0.045
2593	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.472	11340760 *		251	50.8
3195	13C-OCDF	454/456 (87/100)	454+456	2.316	6369610 *		273	56.8
1719	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.358	9118710 *		219	46.5
2708	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.030	7226040 *		236	48.2
3187	13C-OCDD	470/472 (87/100)	470+472	2.028	5890840 *		288	58.8

* = SEE FILE C21005DL FOR QUANTITATION OF DILUTED SAMPLE.

GC/MS ANALYST: K. THORNBURG ANALYSIS DATE: 2/22/88
DATA ENTRY REVIEWED: Mike Molloy DATE: 3/4/88

DATA ANALYST: J. PALAUSKY ANALYSIS DATE: 2/29/88
REVIEWED: Mike Molloy DATE: 3/4/88

DATA ENTRY: J. PALAUSKY ENTRY DATE: 2/29/88
REVIEWED:__________ DATE:__________

C21005XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985B22X1
SAMPLE ID: 21005-6 (FILTER)

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	98	NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	24.00 NG
13C-2,3,7,8-TCDD	25.00 NG
13C-1,2,3,7,8-PeCDD	24.80 NG
13C-1,2,3,4,6,7,8-HpCDD	98.00 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA	AMOUNT IN SAMPLE (NG)
1656	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	2127864	29.3
1746	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	43123	1.03
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	16956292	233
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	6530121	116
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	2825844	52.7
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	951832	24.4
3196	OCTA-CDF	442/444 (87/100)	442+444	2.121	109997	5.14
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	1647850	39.4
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	1911829	51.4
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	1424417	39.9
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	1882856	61.5
NA	OCTA-CDD	458/460 (87/100)	458+460	1.979	874560	43.8

GC/MS ANALYST: K. THORNBURG ANALYSIS DATE: 2/22/88 REVIEWED:________________ DATE:________

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/19/88 REVIEWED: Mike Molloy DATE: 5/19/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/19/88 REVIEWED:________________ DATE: 3/9/88

C21005DL

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C10X5
SAMPLE ID: 21005-6 (CYCLONE/FILTER) IN 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	98.0 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	24.0 NG
13C-2,3,7,8-TCDD	25.0 NG
13C-1,2,3,7,8-PeCDD	24.8 NG
13C-1,2,3,4,6,7,8-HpCDD	98.0 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/19/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2678	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	803272	NA	98.0	NA
1646	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.487	424708	20.83	NA	86.8
1737	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.742	339008	23.74	NA	95.0
2320	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	182896	21.29	NA	85.8
2954	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.729	532648	89.17	NA	91.0
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.348	NA		NA	NA
2588	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.472	8291120		341	68.9
3196	13C-OCDF	454/456 (87/100)	454+456	2.316	3585740		285	59.4
1711	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.358	8743990		273	58.2
2705	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.030	5444980		331	67.5
3187	13C-OCDD	470/472 (87/100)	470+472	2.028	4162080		378	77.1

GC/MS ANALYST: K. THORNBURG ANALYSIS DATE: 3/10/88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/16/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/16/88

DATA ENTRY REVIEWED: PJHarrison DATE: 4-19-88

REVIEWED: Mike Molloy DATE: 3/16/88

REVIEWED: ____________ DATE: ________

C21005DL

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C10X5
SAMPLE ID: 21005-6 (CYCLONE/FILTER) IN 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD 98 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	24.00 NG
13C-2,3,7,8-TCDD	25.00 NG
13C-1,2,3,7,8-PeCDD	24.80 NG
13C-1,2,3,4,6,7,8-HpCDD	98.00 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
1650	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	1809500		39.4
1739	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	40969		1.28
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	15401678		336
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	4897981		151
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	1620491		56.1
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	496070		23.6
3196	OCTA-CDF	442/444 (87/100)	442+444	2.121	44258		3.84
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	945705		29.5
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	743531		34.6
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	368514		19.2
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	331341		20.08
NA	OCTA-CDD	458/460 (87/100)	458+460	1.978	5374	ND<	0.500

GC/MS ANALYST: K. THORNBURG ANALYSIS DATE: 3/10/88 REVIEWED:__________ DATE:______

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/16/88 REVIEWED: Mike Molloy DATE: 5/16/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/17/88 REVIEWED: J Coates DATE: 3/8/89

518

F21007XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C08X8
SAMPLE ID: 21007 (FRONT 1/2) IN 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.6 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2637	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	2355830	NA	19.6	NA
1611	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	873248	3.05	NA	63.5
1700	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	643536	3.30	NA	66.0
2278	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	418037	3.32	NA	67.1
2912	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	1348440	16.11	NA	82.2
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	NA		NA	NA
2548	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	8766200		25.9	5.24
3153	13C-OCDF	454/456 (87/100)	454+456	1.946	7228090		54.0	11.2
1674	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	7274290		22.7	4.84
2663	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	5666010		24.2	4.94
3144	13C-OCDD	470/472 (87/100)	470+472	1.702	6401180		54.7	11.2

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/8/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/16/88
DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/16/88

DATA ENTRY REVIEWED: PJ Harrison DATE: 4-18-88
REVIEWED: Mike Molloy DATE: 3/16/88
REVIEWED:__________ DATE:__________

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F21007XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C08X8
SAMPLE ID: 21007 (FRONT 1/2) IN 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.60 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA	AMOUNT IN SAMPLE (NG)
1614	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	2624300	5.56
1700	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	50153	0.165
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	16808785	35.6
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	6732202	18.1
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	3000236	8.21
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	1122164	4.21
3153	OCTA-CDF	442/444 (87/100)	442+444	2.121	177382	1.22
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	2090393	6.86
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	2098209	8.53
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	2141838	8.81
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	2333448	11.2
NA	OCTA-CDD	458/460 (87/100)	458+460	1.978	NA *	

* = SEE FILE F21007X0 FOR PEAK HEIGHT QUANTITATION OF OCDD.

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/8/88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/17/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/18/88

REVIEWED:__________ DATE:______

REVIEWED: Mike Molloy DATE: 5/17/88

REVIEWED: J Bates DATE: 3/8/85

FZ1007X0

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C08X8
SAMPLE ID: 21007 (FRONT 1/2) IN 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.6 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (PEAK HEIGHT(S)/PEAK HEIGHT(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (PEAK HEIGHT(S)/PEAK HEIGHT(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	PEAK HEIGHT	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2637	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	348672	NA	19.6	NA
2912	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.738	196096	14.94	NA	76.2

GC/MS ANALYST: DAVE MILLS   ANALYSIS DATE: 3/8/88
DATA ANALYST: MIKE MOLLOY   ANALYSIS DATE: 5/24/88
DATA ENTRY: MIKE MOLLOY   ENTRY DATE: 5/24/88

DATA ENTRY REVIEWED: ____________ DATE: ____________
REVIEWED: Mike Molloy DATE: 5/24/88
REVIEWED: J Yates DATE: 3/9/89

F21007X0

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C08X8
SAMPLE ID: 21007 (FRONT 1/2) IN 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.60 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (PEAK HEIGHT(S)/PEAK HEIGHT(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	entry error ~~TOTAL~~ hz 5/24/88 PK HT	AMOUNT IN SAMPLE (NG)
3147	OCTA-CDD	458/460 (87/100)	460	0.924	128896	13.9

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/8/88 REVIEWED:________________ DATE:________

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/24/88 REVIEWED: Mike Molloy DATE: 5/24/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/24/88 REVIEWED:________________ DATE:________

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B21008XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C22X5
SAMPLE ID: 21008 (BACK 1/2) IN 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	98.0 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.6 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2644	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	728705	NA	98.0	NA
1609	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	410286	23.14	NA	482.1
1697	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	359136	29.78	NA	595.6
2284	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	166276	21.34	NA	431.1
2922	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	369828	71.43	NA	364.5
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	32998	ND <	0.307	0.0628
2555	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	2840690		30.6	6.19
3159	13C-OCDF	454/456 (87/100)	454+456	1.946	497196		13.5	2.82
1672	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.497	8635890		48.3	10.3
2672	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	1087088		16.9	3.46
3151	13C-OCDD	470/472 (87/100)	470+472	1.702	412444		12.8	2.62

GC/MS ANALYST:	DAVE MILLS	ANALYSIS DATE:	3/22/88	DATA ENTRY REVIEWED: Harrison	DATE: 4-18-88
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	3/23/88	REVIEWED: Mike Molloy	DATE: 3/23/88
DATA ENTRY:	MIKE MOLLOY	ENTRY DATE:	3/23/88	REVIEWED:	DATE:

BZ1008XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C22X5
SAMPLE ID: 21008 (BACK 1/2) IN 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD 19.6 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.6 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2644	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	728705	NA	19.6	NA
1609	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	410286	4.63	NA	96.4
1697	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	359136	5.96	NA	119.1
2294	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	166276	4.27	NA	86.2
2922	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	369828	14.29	NA	72.9
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	32998	ND <	0.307	0.0628
2555	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	2840690		30.6	6.19
3159	13C-OCDF	454/456 (87/100)	454+456	1.946	497196		13.5	2.82
1672	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	8635890		48.3	10.3
2672	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	1087088		16.9	3.46
3151	13C-OCDD	470/472 (87/100)	470+472	1.702	412444		12.8	2.62

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/22/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/23/88
DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/23/88

DATA ENTRY REVIEWED:________ DATE:________
REVIEWED: Mike Molloy DATE: 3/23/88
REVIEWED:________ DATE:________

B21008XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C22XS
SAMPLE ID: 21008 (BACK 1/2) IN 250

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	98 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.60 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
1512	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	487788		2.200
1699	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	6040		0.0355
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	5307149		23.937
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	857786		5.81
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	155146		1.55
2836	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	26278		0.359
NA	OCTA-CDF	442/444 (87/100)	442+444	2.121	2714	ND<	0.0678
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	335380		1.97
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	92068		0.941
2580	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	24036		0.360
2963	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	12761		0.223
NA	OCTA-CDD	458/460 (87/100)	458+460	1.978	4363	ND<	0.117

GC/MS ANALYST:	DAVE MILLS	ANALYSIS DATE:	3/22/88	REVIEWED: ____________	DATE: ________
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	5/19/88	REVIEWED: Mike Molloy	DATE: 5/19/88
DATA ENTRY:	P. PERKINS	ENTRY DATE:	5/19/88	REVIEWED: ____________	DATE: ________

X21009XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C21X3
SAMPLE ID: 21009 (XAD) IN 250

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	98.0 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.6 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2565	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1629340	NA	98.0	NA
1629	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	187276	4.72	NA	98.4
1719	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	116528	4.32	NA	86.4
2308	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	87950	5.05	NA	102.0
2939	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	186645	16.12	NA	82.3
2164	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	24751400		436	89.0
2577	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	401722		8.58	1.73
3176	13C-OCDF	454/456 (87/100)	454+456	1.946	57977		3.13	0.652
1693	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	585928		10.1	2.15
2692	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	184783		5.71	1.16
3168	13C-OCDD	470/472 (87/100)	470+472	1.702	41096		2.54	0.517

GC/MS ANALYST: KELLY T. ANALYSIS DATE: 3/21/88 DATA ENTRY REVIEWED: ______ DATE: 4-18-88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/23/88 REVIEWED: Mike Molloy DATE: 3/23/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/23/88 REVIEWED: ______ DATE: ______

X21009XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C21X3
SAMPLE ID: 21009 (XAD) IN 250

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	98 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.60 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
1633	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	25568		0.253
NA	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	8434	ND<	0.153
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	195297		1.93
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	20464		0.262
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	7591	ND<	0.150
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	5122	ND<	0.139
NA	OCTA-CDF	442/444 (87/100)	442+444	2.121	3837	ND<	0.190
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	8434	ND<	0.153
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	19795	ND<	0.382
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	6348	ND<	0.189
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	3359	ND<	0.116
NA	OCTA-CDD	458/460 (87/100)	458+460	1.978	5374	ND<	0.285

GC/MS ANALYST: K. THORNBURG ANALYSIS DATE: 3/21/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/19/88
DATA ENTRY: P. PERKINS ENTRY DATE: 5/19/88

REVIEWED:__________ DATE:______
REVIEWED: Mike Molloy DATE: 5/19/88
REVIEWED: DATE: 3/8/55

C2101SXX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C09X5
SAMPLE ID: 21015-16 (CYCLONE/FILTER) IN 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	24.0 NG
13C-2,3,7,8-TCDD	25.0 NG
13C-1,2,3,7,8-PeCDD	24.8 NG
13C-1,2,3,4,6,7,8-HpCDD	98.0 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2649	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	153362	NA	*	NA
1620	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	353548	0.00	NA	0.0 *
1710	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	304768	0.00	NA	0.0 *
2291	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	150530	0.00	NA	0.0 *
2924	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	484580	0.00	NA	0.0 *
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	NA		NA	NA
2559	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	4467280		184	37.1
3164	13C-OCDF	454/456 (87/100)	454+456	1.946	2413780		251	52.3
1684	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	4395830		145	30.8
2675	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	2783110		166	33.8
3156	13C-OCDD	470/472 (87/100)	470+472	1.702	2382170		283	57.9

* = SAMPLE MAY NOT BE SPIKED WITH RIS.

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/9/88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/16/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/16/88

DATA ENTRY REVIEWED: ______ DATE: 4/12/83

REVIEWED: Mike Molloy DATE: 3/16/88

REVIEWED: ______ DATE: ______

C21015XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C09XS
SAMPLE ID: 21015-16 (CYCLONE/FILTER) IN 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	24.00 NG
13C-2,3,7,8-TCDD	25.00 NG
13C-1,2,3,7,8-PeCDD	24.80 NG
13C-1,2,3,4,6,7,8-HpCDD	98.00 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
1623	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	870344		22.8
NA	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	16703	MD<	0.579
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	7308562		191
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	2587321		96.3
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	889026		33.9
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	278745		14.5
3165	OCTA-CDF	442/444 (87/100)	442+444	2.121	31375		3.040
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	574648		19.9
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	536695		30.3
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	394895		22.6
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	505323		33.7
NA	OCTA-CDD	458/460 (87/100)	460	1.055	136024		26.1

GC/MS ANALYST: K. THORNBURG ANALYSIS DATE: 3/9/88 REVIEWED:______________ DATE:________

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/16/88 REVIEWED: Mike Molloy DATE: 5/16/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/17/88 REVIEWED: DATE: 3/10/88

F21017XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C09X1
SAMPLE ID: 21017 (FRONT 1/2) IN 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.6 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2645	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1690790	NA	19.6	NA
1615	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	665490	3.24	NA	67.4
1703	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	517120	3.70	NA	73.9
2296	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	341897	3.78	NA	76.4
2922	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	819856	13.65	NA	69.6
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	NA		NA	NA
2555	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	4728370		23.0	4.65
3161	13C-OCDF	454/456 (87/100)	454+456	1.946	3262660		40.1	8.35
1678	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	4241340		16.5	3.51
2672	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	3300210		23.2	4.74
3153	13C-OCDD	470/472 (87/100)	470+472	1.702	3040380		42.7	8.71

GC/MS ANALYST: KELLY T. ANALYSIS DATE: 3/9/88 DATA ENTRY REVIEWED: MBS DATE: [illegible]

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/16/88 REVIEWED: Mike Molloy DATE: 3/16/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/16/88 REVIEWED: ____________ DATE: ____________

FZ1017XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C09X1
SAMPLE ID: 21017 (FRONT 1/2) IN 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD 19.6 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.60 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA	AMOUNT IN SAMPLE (NG)
1618	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	983984	2.74
1705	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	20971	0.0856
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	8180270	22.7
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	2603068	8.57
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	925535	4.16
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	294593	1.82
3161	OCTA-CDF	442/444 (87/100)	442+444	2.121	39317	0.443
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	547671	2.24
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	517427	2.57
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	367829	2.49
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	549684	4.33
NA	OCTA-CDD	458/460 (87/100)	460	1.055	179344	4.06

GC/MS ANALYST: K. THORNBURG ANALYSIS DATE: 3/9/88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/16/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/17/88

REVIEWED:________ DATE:________

REVIEWED: Mike Molloy DATE: 5/16/88

REVIEWED: J Coates DATE: 3/8/86

B21018XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C22X6
SAMPLE ID: 21018 (BACK 1/2) IN 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.6 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2647	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	158076	NA	*	NA
1612	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	223092	0.00	NA	0.0 *
1698	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	179331	0.00	NA	0.0 *
2295	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	79386	0.00	NA	0.0 *
2925	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	174464	0.00	NA	0.0 *
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	26393	ND <	0.515	0.105
2557	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	2115256		48.3	9.77
3160	13C-OCDF	454/456 (87/100)	454+456	1.946	300923		17.4	3.62
1673	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	5373100		60.2	12.9
2674	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	811160		26.8	5.47
3153	13C-OCDD	470/472 (87/100)	470+472	1.702	198596		13.1	2.67

* = SAMPLE MAY NOT BE SPIKED WITH RIS. SEE DATA FILE C21018RI FOR QUANTITATION.

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/22/88 DATA ENTRY REVIEWED: PJHarrison DATE: 4-18-88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/23/88 REVIEWED: Mike Molloy DATE: 3/23/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/23/88 REVIEWED:________ DATE:________

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C22X6
SAMPLE ID: 21018 (BACK 1/2) IN 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19 60 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
1614	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	249628		2.071
NA	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	17473	ND<	0.206
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	3042792		25.2
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	389114		5.52
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	42229		0.893
2841	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	8402		0.244
NA	OCTA-CDF	442/444 (87/100)	442+444	2.121	8372	ND<	0.444
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	83297		0.981
2059	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	12803		0.274
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	8323	ND<	0.265
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	6046	ND<	0.224
NA	OCTA-CDD	458/460 (87/100)	458+460	1.978	5374	ND<	0.305

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/22/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/19/88
DATA ENTRY: P. PERKINS ENTRY DATE: 5/19/88

REVIEWED:__________ DATE:______
REVIEWED: Mike Molloy DATE: 5/19/88
REVIEWED:__________ DATE:______

B21018RI

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C24X2
SAMPLE ID: 21018 (BACK 1/2) IN 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	98.0 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.6 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2666	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	2774330	NA	98.0	NA
1633	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	74020	1.10	NA	22.8
1723	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	65120	1.42	NA	28.4
2307	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	67446	2.27	NA	45.9
2943	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	93574	4.75	NA	24.2
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	11937	ND <	0.274	0.0560
2577	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	1022236		43.6	8.80
3180	13C-OCDF	454/456 (87/100)	454+456	1.946	146775		15.8	3.29
1696	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	2348740		72.5	15.4
2634	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	472916		29.1	5.95
3172	13C-OCDD	470/472 (87/100)	470+472	1.702	90191		11.1	2.26

GC/MS ANALYST: GENE O. ANALYSIS DATE: 3/24/88 DATA ENTRY REVIEWED: PJHarrism DATE: 4-18-88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 4/2/88 REVIEWED: Mike Molloy DATE: 4/2/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 4/2/88 REVIEWED:________ DATE:________

821018RI

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C24X2
SAMPLE ID: 21018 (BACK 1/2) IN 250 (REP. INJ.)

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	98 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.60 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
1612	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	92385		2.310
NA	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	4365	ND<	0.142
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	1236706		30.9
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	125173		2.090
2490	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	10477		0.413
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	3653	ND<	0.197
NA	OCTA-CDF	442/444 (87/100)	442+444	2.121	4611	ND<	0.455
1460	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	8012		0.260
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	5239	ND<	0.132
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	5688	ND<	0.337
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	4900	ND<	0.338
NA	OCTA-CDD	458/460 (87/100)	458+460	1.978	5374	ND<	0.569

GC/MS ANALYST: GENE O. ANALYSIS DATE: 3/24/88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/18/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/19/88

REVIEWED:__________ DATE:______

REVIEWED: Mike Molloy DATE: 5/18/88

REVIEWED:__________ DATE:______

X21019XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C21X4
SAMPLE ID: 21019 (XAD) 250 IN

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	98.0 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.6 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2563	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1806780	NA	98.0	NA
1629	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	214888	4.89	NA	102
1717	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	161064	5.39	NA	108
2306	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	102246	5.29	NA	107
2937	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	205431	16.00	NA	81.6
2163	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	25134930		381	77.7
2575	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	364082		7.07	1.43
3173	13C-OCDF	454/456 (87/100)	454+456	1.946	45377		2.22	0.463
1693	13C-1,2,3,4-TCDD	332/334 (76/10C)	332+334	2.487	762357		9.52	2.02
2691	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	159745		4.48	0.915
3166	13C-OCDD	470/472 (87/100)	470+472	1.702	28508		1.60	0.326

GC/MS ANALYST: KELLY T. ANALYSIS DATE: 3/21/88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 4/1/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 4/1/88

DATA ENTRY REVIEWED: Harrison DATE: 4-18-88

REVIEWED: Mike Molloy DATE: 4/1/88

REVIEWED: ____________ DATE: ________

X21019XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C21X4
SAMPLE ID: 21019 (XAD) 250 IN

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	98 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.60 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
1633	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	30523		0.263
NA	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	10891	ND<	0.143
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	407695		3.51
2051	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	24192		0.266
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	6656	ND<	0.120
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	3031	ND<	0.0746
NA	OCTA-CDF	442/444 (87/100)	442+444	2.121	2682	ND<	0.121
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	8684	ND<	0.114
2236	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	23261		0.387
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	5549	ND<	0.150
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	34348		1.079
3168	OCTA-CDD	458/460 (87/100)	458+460	1.978	36041		1.74

GC/MS ANALYST: K. THORNBURG ANALYSIS DATE: 3/21/88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/19/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/19/88

REVIEWED:________________ DATE:________

REVIEWED: Mike Molloy DATE: 5/19/88

REVIEWED: J Yates DATE: 3/8/89

F21026XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C09X2
SAMPLE ID: 21026 (FILTER) OUT 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.6 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2648	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1677930	NA	19.6	NA
1619	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	838635	4.11	NA	85.6
1707	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	526720	3.79	NA	75.9
2290	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	375264	4.18	NA	84.5
2925	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	997080	16.73	NA	85.3
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	NA		NA	NA
2559	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	3063490		12.3	2.47
3164	13C-OCDF	454/456 (87/100)	454+456	1.946	2095580		21.2	4.41
1682	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	2843340		10.9	2.31
2675	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	2094184		12.1	2.47
3157	13C-OCDD	470/472 (87/100)	470+472	1.702	2140500		24.7	5.04

GC/MS ANALYST: KELLY T. ANALYSIS DATE: 3/9/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/16/88
DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/16/88

DATA ENTRY REVIEWED: DATE: 4/12/88
REVIEWED: Mike Molloy DATE: 3/16/88
REVIEWED: ______ DATE: ______

F21026XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C09X2
SAMPLE ID: 21026 (FILTER) OUT 420

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	4.90 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.60 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA	AMOUNT IN SAMPLE (NG)
1622	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	751884	1.66
1708	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	15887	0.0637
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	6221670	13.7
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	2310436	6.93
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	1103086	4.08
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	1402570	7.12
3165	OCTA-CDF	442/444 (87/100)	442+444	2.121	2024060	18.8
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	796294	3.19
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	1025308	4.64
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	1355756	7.54
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	1309234	8.48
3157	OCTA-CDD	458/460 (87/100)	458+460	1.978	3388380	33.7

GC/MS ANALYST: K. THORNBURG ANALYSIS DATE: 3/9/88 REVIEWED:________ DATE:________

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/17/88 REVIEWED: Mike Molloy DATE: 5/17/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/18/88 REVIEWED:________ DATE:________

F21027XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C09X3
SAMPLE ID: 21027 (FRONT 1/2) OUT 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.6 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2649	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1526490	NA	19.6	NA
1620	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	632080	3.40	NA	70.9
1707	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	553184	4.38	NA	87.6
2291	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	344036	4.22	NA	85.2
2926	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	790920	14.59	NA	74.4
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	NA		NA	NA
2560	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386	2.784 *	119074		1.06	0.214
3167	13C-OCDF	454/456 (87/100)	454+456	1.946	NA **			
1683	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	185218		0.673	0.143
2677	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	201090		1.47	0.299
3158	13C-OCDD	470/472 (87/100)	470+472	1.702	163820		2.38	0.487

* = THE RRF WAS CALCULATED USING THE 386 ION ONLY AND NOT THE 386 + 388 IONS. ** = SEE FILE F21027X0 FOR QUANTIATION.

GC/MS ANALYST:	KELLY T.	ANALYSIS DATE:	3/9/88	DATA ENTRY REVIEWED:	[illegible]	DATE:	[illegible]
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	3/16/88	REVIEWED:	Mike Molloy	DATE:	3/16/88
DATA ENTRY:	MIKE MOLLOY	ENTRY DATE:	3/16/88	REVIEWED:		DATE:	

F21027X0

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C09X3
SAMPLE ID: 21027 (FRONT 1/2) OUT 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.6 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (PEAK HEIGHT(S)/PEAK HEIGHT(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (PEAK HEIGHT(S)/PEAK HEIGHT(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	PEAK HEIGHT	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2649	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	266752	NA	19.6	NA
2926	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.738	137728	13.71	NA	70.0
3167	13C-OCDF	454/456 (87/100)	454	0.899	14240		2.25	0.470

GC/MS ANALYST: KELLY T. ANALYSIS DATE: 3/9/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/31/88
DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/31/88

DATA ENTRY REVIEWED: DATE: 4/13/88
REVIEWED: Mike Molloy DATE: 3/31/88
REVIEWED: DATE:

F21027XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C09X3
SAMPLE ID: 21027 (FRONT 1/2) OUT 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.60 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
1524	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	128697		0.377
NA	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	16129	ND<	0.0616
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	722493		2.12
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	248402		0.813
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	118616		0.553
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	58921		0.377
3167	OCTA-CDF	442/444 (87/100)	442+444	2.121	11921		0.139
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	51590		0.197
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	86900		0.429
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	176888		1.24
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	177954		1.45
3159	OCTA-CDD	458/460 (87/100)	458+460	1.978	136061		1.70

GC/MS ANALYST: K. THORNBURG ANALYSIS DATE: 3/9/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/16/88
DATA ENTRY: P. PERKINS ENTRY DATE: 5/17/88

REVIEWED:__________ DATE:______
REVIEWED: Mike Molloy DATE: 5/16/88
REVIEWED:__________ DATE:______

821028XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985B22X2
SAMPLE ID: 21028(BACK 1/2)

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	98.0 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	24.0 NG
13C-2,3,7,8-TCDD	25.0 NG
13C-1,2,3,7,8-PeCDD	24.8 NG
13C-1,2,3,4,6,7,8-HpCDD	98.0 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/19/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2579	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1819960	NA	98.0	NA
1651	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.487	791296	17.13	NA	71.4
1742	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.742	611008	18.88	NA	75.5
2325	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	464262	23.85	NA	96.2
2954	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.729	1299970	96.05	NA	98.0
2176	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.348	34980		0.56	0.114
2591	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.472	19685690 *		332	67.0
3192	13C-OCDF	454/456 (87/100)	454+456	2.316	8748460 *		285	59.3
1717	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.358	17870450 *		310	66.0
2706	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.030	13139540 *		327	66.7
3184	13C-OCDD	470/472 (87/100)	470+472	2.028	9897160 *		368	75.1

* = SEE FILE 8210280L FOR QUANTITATION OF SAMPLE DILUTION.

GC/MS ANALYST: K. THORNBURG ANALYSIS DATE: 2/22/88

DATA ANALYST: J. PALAUSKY ANALYSIS DATE: 2/29/88

DATA ENTRY: J. PALAUSKY ENTRY DATE: 2/29/88

DATA ENTRY REVIEWED: Mike Molloy DATE: 3/9/88

REVIEWED: Mike Molloy DATE: 3/9/88

REVIEWED: ____________ DATE: ____________

821020XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985B22X2
SAMPLE ID: 21029 (BACK 1/2)

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	98 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	24.00 NG
13C-2,3,7,8-TCDD	25.00 NG
13C-1,2,3,7,8-PeCDD	24.80 NG
13C-1,2,3,4,6,7,8-HpCDD	98.00 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA	AMOUNT IN SAMPLE (NG)
1655	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	3543440	41.4
1745	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	90476	1.56
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	30643638	358
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	11191053	136
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	4132455	58.6
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	1230587	23.9
3192	OCTA-CDF	442/444 (87/100)	442+444	2.121	114368	4.065
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	2378867	41.1
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	1714722	31.4
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	1018510	21.7
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	857121	21.3
NA	OCTA-CDD	458/460 (87/100)	460	1.055	203968	14.6

GC/MS ANALYST: K. THORNBURG ANALYSIS DATE: 2/22/88 REVIEWED:________ DATE:______

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/19/88 REVIEWED: Mike Molloy DATE: 5/19/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/19/88 REVIEWED:________ DATE:______

8210280L

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C10X6
SAMPLE ID: 21028 (BACK 1/2) OUT 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	98.0 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	24.0 NG
13C-2,3,7,8-TCDD	25.0 NG
13C-1,2,3,7,8-PeCDD	24.8 NG
13C-1,2,3,4,6,7,8-HpCDD	98.0 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/19/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2679	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	808468	NA	98.0	NA
1646	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.487	436908	21.30	NA	88.7
1736	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.742	297152	20.67	NA	82.7
2319	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	179098	20.71	NA	83.5
2955	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.729	622508	103.54	NA	106
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.348	16575	NDC	0.685	0.140
2589	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.472	6539030		230	46.5
3196	13C-OCDF	454/456 (87/100)	454+456	2.316	4179520		284	59.2
1711	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.358	6083000		217	46.2
2705	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.030	4114450		214	43.6
3188	13C-OCDD	470/472 (87/100)	470+472	2.028	3742640		291	59.3

GC/MS ANALYST: K. THORNBURG ANALYSIS DATE: 3/10/88 DATA ENTRY REVIEWED: Harrison DATE: 4-19-88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/16/88 REVIEWED: Mike Molloy DATE: 3/16/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/16/88 REVIEWED: ____________ DATE: ________

8Z10280L

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C10X6
SAMPLE ID: 21028 (BACK 1/2) OUT 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	98 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	24.00 NG
13C-2,3,7,8-TCDD	25.00 NG
13C-1,2,3,7,8-PeCDD	24.90 NG
13C-1,2,3,4,6,7,8-HpCDD	98.00 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA	AMOUNT IN SAMPLE (NG)
1651	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	1250120	26.5
1738	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	25937	0.922
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	10622551	225
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	3854491	121
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	1514341	44.9
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	558275	22.7
3196	OCTA-CDF	442/444 (87/100)	442+444	2.121	74620	5.54
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	1096190	39.0
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	1136847	54.0
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	767544	34.2
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	1116428	57.9
3187	OCTA-CDD	458/460 (87/100)	458+460	1.978	628792	50.0

GC/MS ANALYST: K. THORNBURG ANALYSIS DATE: 3/10/88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/16/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/17/88

REVIEWED:________________ DATE:________

REVIEWED: Mike Molloy DATE: 5/19/88

REVIEWED: DATE: 3/8/89

X21029XX

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C22X3
SAMPLE ID: 21029 (XAD) OUT 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	98.0 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.6 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2645	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	2151190	NA	98.0	NA
1615	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	155156	2.96	NA	61.8
1705	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	98144	2.76	NA	55.1
2296	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	93670	4.07	NA	82.3
2922	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	122822	8.04	NA	41.0
2144	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	13121330		217	44.3
2555	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	983924		31.9	6.45
3158	13C-OCDF	454/456 (87/100)	454+456	1.946	321384		26.4	5.49
1677	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	2122782		43.5	9.25
2673	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	961532		45.1	9.21
3151	13C-OCDD	470/472 (87/100)	470+472	1.702	467362		43.8	8.94

GC/MS ANALYST: KELLY T. ANALYSIS DATE: 3/22/88 DATA ENTRY REVIEWED: Mike Molloy DATE: D 3/4/4/88

RHarrison 4-18-88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/23/88 REVIEWED: Mike Molloy DATE: 4/4/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/23/88 REVIEWED:______ DATE:______

D: entry error mm 4/4/88

X21029XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C22X3
SAMPLE ID: 21029 (XAD) OUT 420

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	98 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.60 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
1619	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	364628		4.35
1707	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	14359		0.309
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	2801307		33.4
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	574952		6.91
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	135202		4.061
2836	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	27043		1.11
NA	OCTA-CDF	442/444 (87/100)	442+444	2.121	7287	ND<	0.548
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	158866		3.42
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	83463		1.51
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	25793		1.16
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	32913		1.73
NA	OCTA-CDD	458/460 (87/100)	458+460	1.978	35232		2.84

GC/MS ANALYST:	K. THORNBURG	ANALYSIS DATE:	3/22/88	REVIEWED:		DATE:	
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	5/20/88	REVIEWED:	Mike Molloy	DATE:	5/20/88
DATA ENTRY:	P. PERKINS	ENTRY DATE:	5/23/88	REVIEWED:	J Watts	DATE:	3/8/88

FZ1036XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 898SL09
GC/MS DATA FILE: 898SC09X4
SAMPLE ID: 21036 (FILTER) OUT 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.6 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2650	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1769910	NA	19.6	NA
1620	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	797976	3.71	NA	77.2
1707	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	482848	3.30	NA	65.9
2291	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	376872	3.98	NA	80.5
2927	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	952408	15.15	NA	77.3
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	NA		NA	NA
2561	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	4160600		17.4	3.52
3166	13C-OCDF	454/456 (87/100)	454+456	1.946	1576024		16.7	3.47
1682	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	3508200		14.6	3.11
2677	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	3077170		18.6	3.80
3159	13C-OCDD	470/472 (87/100)	470+472	1.702	1002420		12.1	2.47

GC/MS ANALYST: KELLY T. ANALYSIS DATE: 3/9/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/16/88
DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/16/88

DATA ENTRY REVIEWED: BS DATE: [illegible]
REVIEWED: Mike Molloy DATE: 3/16/88
REVIEWED: DATE:

F21036XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C09X4
SAMPLE ID: 21036 (FILTER) OUT 250

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.60 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA	AMOUNT IN SAMPLE (NG)
1623	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	876928	2.03
1709	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	23016	0.101
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	6718186	15.6
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	2686289	8.03
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	1149829	4.45
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	450492	2.39
3167	OCTA-CDF	442/444 (87/100)	442+444	2.121	71228	0.691
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	734559	3.21
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	940945	4.24
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	1129852	6.58
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	1272254	8.62
3159	OCTA-CDD	458/460 (87/100)	458+460	1.978	671224	6.98

GC/MS ANALYST: K. THORNBURG   ANALYSIS DATE: 3/9/88
DATA ANALYST: MIKE MOLLOY   ANALYSIS DATE: 5/17/88
DATA ENTRY: P. PERKINS   ENTRY DATE: 5/18/88

REVIEWED:____________ DATE:________
REVIEWED: Mike Molloy DATE: 5/17/88
REVIEWED: J. [illegible] DATE: 3/5/89

F21037XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C09X8
SAMPLE ID: 21037 (FRONT 1/2) OUT 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.6 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
- 2646	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1395390	NA	19.6	NA
1618	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	690896	4.07	NA	84.8
1707	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	551152	4.77	NA	95.5
2287	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	308160	4.13	NA	83.5
- 2923	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	838816	16.92	NA	86.3
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	NA		NA	NA
2557	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	43893		0.209	0.0422
- 3163	13C-OCDF	454/456 (87/100)	454+456	1.946	NA *			
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	57895	ND<	0.211	0.0449
2674	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	74562		0.512	0.105
3156	13C-OCDD	470/472 (87/100)	470+472	1.702	22358		0.307	0.0626

* = SEE FILE F21037X0 FOR QUANTITATION.

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/9/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/16/88
DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/16/88

DATA ENTRY REVIEWED: DATE: 3/19/88
REVIEWED: Mike Molloy DATE: 3/16/88
REVIEWED: DATE:

FZ1037X0

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C09X8
SAMPLE ID: 21037 (FRONT 1/2) OUT 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.6 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (PEAK HEIGHT(S)/PEAK HEIGHT(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (PEAK HEIGHT(S)/PEAK HEIGHT(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	PEAK HEIGHT	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2646	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	227840	NA	19.6	NA
2923	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.738	144896	16.89	NA	86.2
3163	13C-OCDF	454/456 (87/100)	454	0.899	2026		0.305	0.0635

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/9/88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/16/88

DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/16/88

DATA ENTRY REVIEWED: BS DATE: 4/19/88

REVIEWED: Mike Molloy DATE: 3/16/88

REVIEWED:______________ DATE:__________

F21037XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C09X8
SAMPLE ID: 21037 (FRONT 1/2) OUT 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.90 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.60 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
1621	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	23623		0.0633
NA	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	13519	ND<	0.0518
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	47004		0.126
2037	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	15092		0.0551
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	6659	ND<	0.0293
2840	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	12058		0.0727
NA	OCTA-CDF	442/444 (87/100)	442+444	2.121	6448	ND<	0.0710
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	13519	ND<	0.0518
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	4263	ND<	0.0235
2585	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	9194		0.0608
2865	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	18633		0.143
3156	OCTA-CDD	458/460 (87/100)	458+460	1.978	64729		0.765

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/9/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/18/88
DATA ENTRY: P. PERKINS ENTRY DATE: 5/18/88

REVIEWED:________________ DATE:________
REVIEWED: Mike Molloy DATE: 5/18/88
REVIEWED:________________ DATE:________

8Z1038XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C10X2
SAMPLE ID: 21038 (BACK 1/2) OUT 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	196 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	24.0 NG
13C-2,3,7,8-TCDD	25.0 NG
13C-1,2,3,7,8-PeCDD	24.8 NG
13C-1,2,3,4,6,7,8-HpCDD	98.0 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2677	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	985832	NA	196	NA
1641	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	292600	24.40	NA	102
1732	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	243360	29.83	NA	119
2319	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	161162	30.58	NA	124
2953	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	492194	140.54	NA	143
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	24593	ND<	1.18	0.241
2588	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	5673400		230	46.4
3194	13C-OCDF	454/456 (87/100)	454+456	1.946	1443728		148	30.8
1705	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	4905200		203	43.1
2704	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	3681240		216	44.0
3187	13C-OCDD	470/472 (87/100)	470+472	1.702	1233410		144	29.4

GC/MS ANALYST: KELLY T. ANALYSIS DATE: 3/10/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 3/16/88
DATA ENTRY: MIKE MOLLOY ENTRY DATE: 3/16/88

DATA ENTRY REVIEWED: Mike Molloy DATE: 4/5/88
REVIEWED: GHarrison Mike Molloy DATE: 4-19-88 3/16/88
REVIEWED: ____________ DATE: ____________

8Z1038XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C10X2
SAMPLE ID: 21038 (BACK 1/2) OUT 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	196	NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	24.00 NG
13C-2,3,7,8-TCDD	25.00 NG
13C-1,2,3,7,8-PeCDD	24.80 NG
13C-1,2,3,4,6,7,8-HpCDD	98.00 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA	AMOUNT IN SAMPLE (NG)
1644	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	1122176	35.5
1734	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	27899	1.21
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	9642335	305
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	3195063	112
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	1169780	43.8
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.975	376805	19.4
3195	OCTA-CDF	442/444 (87/100)	442+444	2.121	29384	2.76
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	563731	24.5
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	371571	19.6
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	285508	16.07
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	253795	16.5
3187	OCTA-CDD	458/460 (87/100)	458+460	1.978	116400	11.7

GC/MS ANALYST: KELLY T. ANALYSIS DATE: 3/10/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/16/88
DATA ENTRY: P. PERKINS ENTRY DATE: 5/17/88

REVIEWED:__________ DATE:______
REVIEWED: Mike Molloy DATE: 5/16/88
REVIEWED: DATE: 3/5/84

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XZ1039XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C22X4
SAMPLE ID: 21039 (XAD) OUT 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	98.0 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.6 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2647	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	1894910	NA	98.0	NA
1613	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.384	312696	6.78	NA	141
1700	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.622	132298	4.22	NA	84.4
2287	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	131137	6.47	NA	131
2923	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.696	200760	14.91	NA	76.1
2143	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.195	34246400		405	82.6
2557	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.915	7011090		139	28.1
3159	13C-OCDF	454/456 (87/100)	454+456	1.346	1152264		57.8	12.0
1675	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.487	9794800		149	31.7
2674	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.400	4176620		120	24.5
3152	13C-OCDD	470/472 (87/100)	470+472	1.702	875056		50.2	10.2

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/22/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 4/1/88
DATA ENTRY: MIKE MOLLOY ENTRY DATE: 4/1/88

DATA ENTRY REVIEWED: Mike Molloy DATE: 4/5/88
A Harrison 4-18-88
REVIEWED: Mike Molloy DATE: 4/1/88
REVIEWED: DATE:

X21039X0

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C22X4
SAMPLE ID: 21039 (XAD) OUT 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	98.0 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.6 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490 NG
13C-1,2,3,4,7,8-HxCDF	495 NG
13C-OCDF	480 NG
13C-1,2,3,4-TCDD	470 NG
13C-1,2,3,7,8,9-HxCDD	490 NG
13C-OCDD	490 NG

SURROGATE RECOVERY = (PEAK HEIGHT(S)/PEAK HEIGHT(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (PEAK HEIGHT(S)/PEAK HEIGHT(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/29/88)	PEAK HEIGHT	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2647	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	307200	NA	98.0	NA
2923	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.738	36736	15.88	NA	81.0

GC/MS ANALYST:	DAVE MILLS	ANALYSIS DATE:	3/22/88	DATA ENTRY REVIEWED:		DATE:	
DATA ANALYST:	MIKE MOLLOY	ANALYSIS DATE:	5/24/88	REVIEWED:	Mike Molloy	DATE:	5/24/88
DATA ENTRY:	MIKE MOLLOY	ENTRY DATE:	5/24/88	REVIEWED:		DATE:	

X21039XX

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985CZZX4
SAMPLE ID: 21039 (XAD) OUT 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	98	NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.60 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA	AMOUNT IN SAMPLE (NG)
1616	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	2038182	12.06
1703	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	35765	0.571
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	20269752	120
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	4391391	37.7
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	1329960	24.4
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	350529	8.83
3159	OCTA-CDF	442/444 (87/100)	442+444	2.121	18695	0.86
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	1293645	20.7
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	424228	5.50
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	299790	8.28
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	220539	7.091
NA	OCTA-CDD	458/460 (87/100)	458+460	1.978	NA *	

* = SEE FILE X21039X0 FOR PEAK HEIGHT QUANTITATION OF OCDD.

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/22/88

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/19/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/23/88

REVIEWED:__________ DATE:______

REVIEWED: Mike Molloy DATE: 5/24/88

REVIEWED: J Coates DATE: 3/8/89

X21039X0

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MMS TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 8985C22X4
SAMPLE ID: 21039 (XAD) OUT 420

RECOVERY INTERNAL STANDARD

13C-1,2,3,6,7,8-HxCDD	98 NG

METHOD INTERNAL STANDARDS

13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.60 NG

FIELD SPIKED ANALYTES

13C-1,2,3,7,8-PeCDF	490.0 NG
13C-1,2,3,4,7,8-HxCDF	495.0 NG
13C-OCDF	480.0 NG
13C-1,2,3,4-TCDD	470.0 NG
13C-1,2,3,7,8,9-HxCDD	490.0 NG
13C-OCDD	490.0 NG

AMOUNT IN SAMPLE (NG) = (PEAK HEIGHT(S)/PEAK HEIGHT(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	entry error ~~TOTAL~~ H 5/24/88 PK HT	AMOUNT IN SAMPLE (NG)
NA	OCTA-CDD	458/460 (87/100)	460	0.924	13488	7.79

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 3/22/88 REVIEWED:______________ DATE:________

DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/24/88 REVIEWED: Mike Molloy DATE: 5/24/88

DATA ENTRY: P. PERKINS ENTRY DATE: 5/24/88 REVIEWED:______________ DATE:________

MZ1055XX

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8985L09
GC/MS DATA FILE: 898582SX4
SAMPLE ID: 21055 (FIELD XAD) BLANK

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.6 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	NA
13C-1,2,3,4,7,8-HxCDF	NA
13C-OCDF	NA
13C-1,2,3,4-TCDD	NA
13C-1,2,3,7,8,9-HxCDD	NA
13C-OCDD	NA

SURROGATE RECOVERY = (AREA(S)/AREA(IS)*(AMT(IS)/RRF)

SURROGATE RECOVERY % = (SURROGATE RECOVERY/AMOUNT OF SURROGATE ADDED)*100%

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	ANALYTE	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (2/19/88)	TOTAL AREA	SURROGATE RECOVERY (NG)	AMOUNT IN SAMPLE (NG)	RECOVERY (%)
2650	13C-1,2,3,6,7,8-HxCDD	402/404 (100/82)	402	1.000	936472	NA	19.6	NA
1626	13C-2,3,7,8-TCDF	316/318 (76/100)	316	2.487	571376	4.81	NA	100
1716	13C-2,3,7,8-TCDD	332/334 (76/100)	332	1.742	446688	5.37	NA	107
2296	13C-1,2,3,7,8-PeCDD	366/368 (61/100)	368	1.048	237928	4.75	NA	96.0
2924	13C-1,2,3,4,6,7,8-HpCDD	436/438 (100/99)	436	0.729	485792	13.95	NA	71.2
NA	13C-1,2,3,7,8-PeCDF	350/352 (61/100)	350+352	3.348	9518	ND<	0.0591	
NA	13C-1,2,3,4,7,8-HxCDF	386/388 (100/82)	386+388	4.472	7167	ND<	0.0647	
NA	13C-OCDF	454/456 (87/100)	454+456	2.316	2297	ND<	0.0400	
NA	13C-1,2,3,4-TCDD	332/334 (76/100)	332+334	2.358	35941	ND<	0.171	
2678	13C-1,2,3,7,8,9-HxCDD	402/404 (100/82)	402+404	3.030	13861		0.185	
NA	13C-OCDD	470/472 (87/100)	470+472	2.028	2177	ND<	0.0433	

GC/MS ANALYST: DAVE MILLS   ANALYSIS DATE: 2/25/88   DATA ENTRY REVIEWED: Timothy Grace DATE: 4/15/88

DATA ANALYST: MIKE MOLLOY   ANALYSIS DATE: 3/14/88   REVIEWED: Mike Molloy DATE: 3/14/88

DATA ENTRY: MIKE MOLLOY   ENTRY DATE: 3/14/88   REVIEWED:________________ DATE:____________

Page 2 NATIVE ANALYTES

SAMPLE SPREADSHEET FOR THE QUANTITATION OF C13-TETRA-OCTA CDD/CDF MM5 TRAIN EXTRACTS

PROJECT NO: 8905L09
GC/MS DATA FILE: 8905B25X4
SAMPLE ID: 210SS (FIELD XAD) BLANK

RECOVERY INTERNAL STANDARD	
13C-1,2,3,6,7,8-HxCDD	19.6 NG

METHOD INTERNAL STANDARDS	
13C-2,3,7,8-TCDF	4.80 NG
13C-2,3,7,8-TCDD	5.00 NG
13C-1,2,3,7,8-PeCDD	4.95 NG
13C-1,2,3,4,6,7,8-HpCDD	19.60 NG

FIELD SPIKED ANALYTES	
13C-1,2,3,7,8-PeCDF	NA
13C-1,2,3,4,7,8-HxCDF	NA
13C-OCDF	NA
13C-1,2,3,4-TCDD	NA
13C-1,2,3,7,8,9-HxCDD	NA
13C-OCDD	NA

AMOUNT IN SAMPLE (NG) = (AREA(S)/AREA(IS)*AMT(IS)/RRF)

SCAN NUMBER	NATIVE ANALYTES	CHARACTERISTIC IONS (THEORETICAL RATIO)	ION USED	RESPONSE FACTOR (1/29/88)	TOTAL AREA		AMOUNT IN SAMPLE (NG)
NA	2,3,7,8-TCDF	304/306 (75/100)	304+306	2.594	7109	ND<	0.0230
NA	2,3,7,8-TCDD	320/322 (75/100)	320+322	2.367	19823	ND<	0.0937
NA	TOTAL-TETRA-CDF	304/306 (75/100)	304+306	2.594	7109	ND<	0.0230
NA	TOTAL-PENTA-CDF	338/340 (61/100)	338+340	4.396	4276	ND<	0.0202
NA	TOTAL-HEXA-CDF	374/376 (100/82)	374+376	5.313	4755	ND<	0.0361
NA	TOTAL-HEPTA-CDF	408/410 (100/98)	408+410	3.875	4035	ND<	0.0420
NA	OCTA-CDF	442/444 (87/100)	442+444	2.121	4836	ND<	0.0920
NA	TOTAL-TETRA-CDD	320/322 (75/100)	320+322	2.367	19823	ND<	0.0937
NA	TOTAL-PENTA-CDD	354/356 (61/100)	354+356	2.914	6592	ND<	0.0471
NA	TOTAL-HEXA-CDD	390/392 (100/82)	390+392	3.535	5626	ND<	0.0642
NA	TOTAL-HEPTA-CDD	424/426 (100/99)	424+426	3.036	3001	ND<	0.0399
NA	OCTA-CDD	458/460 (87/100)	458+460	1.978	14304	ND<	0.292

GC/MS ANALYST: DAVE MILLS ANALYSIS DATE: 2/25/88
DATA ANALYST: MIKE MOLLOY ANALYSIS DATE: 5/13/88
DATA ENTRY: P. PERKINS ENTRY DATE: 5/16/88

REVIEWED:________________ DATE:________
REVIEWED: Mike Molloy DATE: 5/13/88
REVIEWED: ________________ DATE: 3/5/89